DEVELOPING TECHNOLOGIES FOR TELEVISION CAPTIONING: BENEFITS FOR THE HEARING IMPAIRED

HEARING

BEFORE THE

SUBCOMMITTEE ON
SCIENCE, RESEARCH AND TECHNOLOGY

OF THE

COMMITTEE ON
SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

NINETY-EIGHTH CONGRESS

FIRST SESSION

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DEVELOPING TECHNOLOGIES FOR TELEVISION CAPTIONING: BENEFITS FOR THE HEARING IMPAIRED

WEDNESDAY, NOVEMBER 9, 1983

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE AND TECHNOLOGY,
SUBCOMMITTEE ON SCIENCE, RESEARCH AND TECHNOLOGY,
Washington, D.C.

The subcommittee met, pursuant to call, at 9:10 a.m., in room 2318, Rayburn House Office Building, Hon. Doug Walgren (chairman of the subcommittee) presiding. Members present: Harkin, Dymally, Durbin, Valentine, Boehlert, McGrath, Skeen, and Bateman.

Mr. WALGREN. Let me call us to order and welcome you to this hearing on technology related to television captioning for the hearing impaired.

Today, the Subcommittee on Science, Research and Technology wants to provide a forum to talk about the variety of developing technologies for television captioning which are so important for the hearing impaired.

As many of you know, I am sure, there are an estimated 16 million hearing-impaired Americans and they have every right to have the same access to television news, special announcements, and entertainment that is really taken for granted by the hearing public. Reduced ability to receive information is one of the most difficult barriers that anyone with a hearing impairment faces.

Television captioning has provided an opportunity to increase the accessibility of the deaf community to a wide range of basic information. However, the amount of captioning being done is very limited because of the cost involved in both captioning the programs and in providing the equipment, or securing the equipment necessary to receive the programs.

We do know that we live in an age of exploding developments in technology, and we have every faith that innovations are going to markedly bring down the cost and expand the access that hearing-impaired people have to television and other media.

One of the objectives of this hearing is to keep us and the Congress current on developments in the area to make sure that we have a current record for other members who may not be able to be here this morning to work with to base their judgment and their opinion on. And to make sure that we in the Congress are doing everything we can to have this technology developed and spread as rapidly as possible.

The witnesses have been asked to comment on both existing and emerging technologies for television captioning, including the Line 21 closed captioning system and teletext, one of the new electronic text technologies. Demonstrations of both of these technologies will be presented so that we have some feel for what is available.

The subcommittee is also interested in hearing the views of witnesses as to what the role of the Federal Government can be if we are to be of help, and of where they see future developments in television captioning going.

Before turning to the witnesses for their testimony, we have several Members of Congress who have been extremely interested in the problems of hearing impaired and have done a lot of work in that area.

I would like first to recognize Tom Harkin of Iowa, who is a member of the Science and Technology Committee. Tom has had a lasting interest in the problems of the hearing impaired and his interest is really the driving force behind this hearing, and much has happened in the developing awareness in the Congress for problems of the hearing impaired. Mr. Harkin?

Mr. HARKIN. Thank you very much, Mr. Chairman. I want to thank you and your very capable staff for really putting this hearing together and getting the witnesses together and organizing so that we could have a demonstration of at least the two technologies that will be under discussion today. So I really want to thank you for taking the time—I know how busy you are, and I know how busy your subcommittee staff is. I am deeply appreciative of this opportunity.

I want to apologize in the beginning for having to leave probably a little bit earlier than I had planned—at 10 o'clock the House goes into session, and my dairy bill is on the floor for my subcommittee so I have to go over and get my bill on the floor of the House shortly after 10 o'clock.

Mr. Chairman, as you said, I do have a longstanding and deep personal interest in the issues discussed today. I have a brother who has been deaf since he has been a child. I have followed his progress through life. I have lived with this all of my life, and I have seen the problems he has had as a hearing-impaired person.

I remember when we finally went from a radio to a television set in our house, and the joy he had in finally being able to watch television. Then it became apparent that he wasn't really getting half of what he was watching because he couldn't hear and couldn't understand what was going on.

So when I came to Congress in 1975, I began to work with a couple of my colleagues—Senator Randolph, Jennings Randolph in the Senate, and Lou Fry from Florida, who is no longer a Member of Congress—to help establish the National Captioning Institute, to make sure it was funded, and to develop the decoders for line 21.

I remember when we presented the first decoder to Rosalyn Carter in the White House. I believe it must have been 1978, maybe 1979. It was for me a very joyous occasion because one of the first decoders, of course, we bought for my brother. Again, it was a tremendous thing to see him now able to watch television and to really understand what was going on.

So we have come a long way. But over the last several months, I became interested in other technologies, and I began hearing more and more about new technologies. That is what led to my asking you for this hearing today.

Mr. Chairman, access to television is not only a question of entertainment for the hearing impaired, it is a means of participating in society and reducing the sense of isolation. The United States has fallen far behind many of the countries in Europe which provide far more captioning and where decoders are far wider used. I understand there were 225,000 decoders in Great Britain last year. In Belgium—a country with only 10 million people—there are 80,000 decoders. And here we are in the United States sitting here with only 70,000 decoders, even though we have 20 times Belgium's population.

Right now there are only two systems for providing closed captions for TV. There is the line 21 system, which uses line 21 of the vertical blanking interval to carry captions. This is, of course, what we have now and this is what the decoders you see over here on the right do.

The other system, which is not widely used, is the teletext. It uses a number of lines in the vertical blanking interval to carry information, and also uses a special decoder. And because of its ability to provide a wide variety of information, including captioning, teletext should appeal to the general population. That could mean lower costs for the decoders.

The key question—and this is what I really want to emphasize—the key question is, how can we best increase the hearing-impaired person's access to television in the near term and also in the long term? Many of us who fought hard for the National Captioning Institute, for the line 21, to reserve line 21 for closed captioning, I guess we probably look at the short term. But we also, I think, have to look at the long term.

Unfortunately, there may be a cross-purpose between these short and long term goals. It seems the common purpose of providing widest possible captioning at the lowest cost is sometimes forgotten in the midst of differing opinions on the best path to pursue, whether it is line 21 or teletext. Somewhat of a battle has developed between the proponents of the two systems.

It is clear that line 21 is currently the primary means of providing closed caption TV. It is also the cheapest right now. It is equally clear that teletext may—and I emphasize the word "may"—may hold out the possibility of a very promising future.

There are questions of standards, costs, timeframe, marketability; and of primary interest to us, whether captioning will be definitely included as a teletext service.

There is also the problem of incompatibility between teletext and line 21. If, in fact, there is a chance that teletext does represent the best path for us to pursue, steps must be taken now to assure a smooth transition from line 21 to teletext as a primary means of providing closed captions.

Hearing-impaired consumers who have invested in line 21 equipment must be protected to the extent possible if, in fact, the path we choose to go is teletext.

Here in the Science and Technology Committee, we need to focus on the compatibilities of the technologies. The possible varied uses which might make a system less expensive because of a wider market and the timeframe involved in bringing a new system on line.

So, Mr. Chairman, my interest, as I have said before, is in both the near term and the long term; to make it as wide as possible and as cheap as possible. There are 70,000 decoders in use. We have barely scratched the surface in reaching the hearing impaired people of this country.

The cost of the decoders are still high; many of the programs are not captioned; many of them are programs that are on at times that the deaf people can't watch them.

So I think the time has come for this committee and, again, I want to thank you for having this hearing—it is time for this Science and Technology Committee to really investigate as thoroughly as possible these technologies and to begin to decide just which path we may want to go down.

Thank you, Mr. Chairman.

Mr. WALGREN. Thank you, Mr. Harkin.

Let me ask if there are other opening statements of any of the Members?

Then I would like to turn to two other Members of Congress who have been active in this area and have demonstrated their concern by focusing on it and are special in that sense. So I want to welcome both Mr. Bonior from Michigan and Mr. Bates from California to the committee.

Let me ask Mr. Bonior to proceed first.

STATEMENT OF HON. DAVID E. BONIOR, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN

Mr. BONIOR. Thank you, Mr. Chairman. I want to commend you for having these hearings on this issue which will raise important aspects of our efforts to guarantee the equal rights of the deaf and the hearing impaired.

I also want to thank my colleague—colleagues, Mr. Bates, who has shown an important leadership on this issue and, of course, Mr. Harkin, who has had a longstanding interest and who has been active in—in efforts to deliver services to those who have a hearing impaired problem.

Television has become the eyes and ears of the world. It is one of the best ways we keep in touch and stay informed today in our society. But for 16 million Americans, who are deaf or hearing impaired, television has been a mute world. It has been a world with eyes but no voice.

The deaf and hearing impaired here today know what that means. To the rest of us, understanding requires an act of imagination.

Imagine not being able to hear the local or the national news. Imagine sitting down with your family to watch a movie. Everyone else is laughing or they are crying. Eager to be included, you ask what has happened, but your family, caught up in the movie, motions you to wait.

In our society, television is more than a source of entertainment or news—it is the vital communication link between our people, the source of life saving information on natural disasters, the center of our civil alert system.

For the deaf and hearing impaired, the mute world of television has isolated them from current events and from shared experiences with neighbors and families. It has isolated them from the everyday culture that shapes our daily lives. The deaf and hearing impaired must anxiously wait—they must wait to know if America has indeed invaded Grenada. They must wait as they struggle to learn about brothers or husbands in Beirut.

The Nation's airways fall within the public domain and are controlled by the most public of all institutions, the Federal Government. The 16 million deaf and hearing impaired are surely part of that public. Their rights are surely of concern to this Government.

If the networks are going to profit from their own access to the airways, then they should help insure the full access of their viewers. It is a matter of corporate responsibility.

Starting in 1979, as Mr. Harkin has relayed to us this morning, ABC, NBC, and PBS agreed to incorporate closed captioning in their program schedules. Closed captions, invisible unless triggered by a special decoding device, enable viewers to read on the TV screen what they cannot hear. This device is commonly referred to as a line 21 decoder.

Today, closed captioning is slowly opening up the world of television to the deaf and the hearing impaired. PBS now captions about 18 hours per week and ABC, which has made great strides in the past 2 years, captions over 20 hours of programing a week.

NBC used to caption two programs, yet its commitment has declined. NBC has discontinued its own closed captioning. Today, just 3 hours per week of closed captioning programing is available and it is available only because other corporations have contributed to the cost.

Despite this relative unity in the television industry, CBS has insisted on going their own way. They are developing their own system, a teletext system called Extravision.

While closed captioning is available today, and has been available for 4 years, the CBS system is still, it appears, a product of the future. Today, the only affiliate in the entire country which is publicly broadcasting teletext is an ABC affiliate in Cincinnati.

And while closed captioning is a common system, used by every other network, Extravision is tied to its own special decoder.

70,000 families have purchased line 21 decodes to watch ABC, NBC, or PBS, yet those decoders will not read teletext.

Having already purchased the affordable, but still relatively expensive line 21 decoder, which cost around $250, hearing-impaired citizens now, CBS insists, must yet make another purchase.

The CBS teletext decoder is far more expensive than the traditional line 21 device and will cost between $1,000 and $3,000, but never mind the cost, which even CBS agrees is out of sight. It is nearly impossible to find a teletext decoder.

A bright young woman in my office set out to locate a teletext decoder and find out how to buy one.

She began her search with CBS figuring the network could certainly have access to the machine for decoding their own unique version of closed captioning. CBS told her that providing access to the decoders was not their responsibility. Neither did they know where to go to find the machines—they deal in only software, she was told.

However, CBS did give her the names of several manufacturers they thought might produce the decoders. She then called Sony, Panasonic, General Electric, RCA, VSA, and Norpack. Only Sony had ever heard of Extravision, teletext, or the decoders.

And Sony said the machines were designed for brokerage houses to allow them to get market updates, not as decoders for the deaf and hearing-impaired, although they could possibly be used for that. Sony also said the decoders were not in production yet but would cost about $1,000 if they ever did go into production.

In the end, we were not even able to find a CBS decoder let alone buy one. And my staff person had two distinct advantages over most deaf and hearing-impaired people, she had access to a long distance line, and she can hear.

In its zeal to declare line 21 obsolete, CBS has failed to tell us that line 21 and teletext captions can be provided by the television industry in a thoroughly compatible way. All that is required is for the CBS affiliates to use a simple and relatively inexpensive device called a caption transcoder.

Indeed, WKRC in Cincinnati, an ABC affiliate, is demonstrating on a daily basis the compatibility of line 21 and teletext broadcasting.

Under this agreement, hearing impaired viewers of WKRC can watch network programs which are captioned with either a line 21 decoder or a teletext decoder manufactured by Zenith Radio Corp.

The hearing-impaired residents of Cincinnati are thus being given the right to choose one decoder over the other. But more than that, those who have already purchased a line 21 decoder have not lost their closed captioning service.

Is it asking too much of CBS to give the hearing-impaired community a freedom of choice?

I support technological innovation, including improvements in the ability to caption TV. Teletext may be an advancement, but that is not the issue.

The issue is the ease of access. How can CBS justify its monopolistic insistence on a separate second system?

The issue is a human concern with the immediate needs of the hearing-impaired community. Even if teletext is the dream of the future, how can CBS justify its refusal to use line 21 on an interim basis, at the least?

How can CBS claim even the most superficial commitments to its deaf and hearing-impaired viewers when a U.S. Congressman cannot locate a decoder? The commitment is a sham.

The National Association of the Deaf summarizes the situation very well when they said, and I quote:

> The CBS claim that they are showing teletext captioning now is absurd. Teletext captioning is not available if deaf people cannot see it. We are tired of this charade, and tired of the attempts by CBS to manipulate and put off the deaf community.

To the 70,000 who have already purchased decoders, CBS says that they are sorry, but the decoders will be useless. To the other deaf and hearing-impaired, CBS counsels that they do not purchase decoders and simply to do without them until CBS is ready with their own system.

The message from CBS, simply stated, is: CBS still knows best; the deaf and hearing-impaired can continue to wait.

This is not a new message to handicapped Americans. It is the old refrain of paternalism that treats the handicapped like children and makes them wait quietly in the corner.

No one knows the needs of the handicapped better than the handicapped. The deaf and hearing-impaired community has made its needs known. And it is time for CBS to listen to you and to me in that community.

I thank you, Mr. Chairman.

[The prepared statement of Mr. Bonior follows:]

STATEMENT OF THE

HONORABLE DAVID E. BONIOR

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Despite this relative unity in the television industry, CBS has insisted on going its own way. It is developing its own system, a teletext system called Extravision.

While closed captioning is available today, and has been available for four (4) years, the CBS system is still, it appears, a product for the future. Today, the only affiliate in the entire country which is publicly broadcasting teletext is an ABC affiliate in Cincinnati.

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She began her search with CBS figuring the network could certainly have access to the machine for decoding their own unique version of closed captioning. CBS told her that providing access to the decoders was not their responsibility. Neither did they know where to go to find the machines--they deal only in software.

However, CBS did give her the names of several manufacturers they thought might produce the decoders. She then called Sony, Panasonic, General Electric, RCA, VSA and Norpack. Only Sony had ever heard of Extravision, teletext or decoders. Sony said the machines were designed for brokerage houses to allow them to get market updates, not as decoders for the deaf and hearing impaired, although they could possibly be used for that. Sony also said the decoders were not in production yet but would cost about $1,000 if they ever did go into production.

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ATTACHMENT

DAVID E. BONIOR
17th District, Michigan

Washington Office:
1130 Longworth Office Building
Washington, D.C. 20515
Tel.: (202) 225-2106

Home Offices:
29 Macomb Place
Mt. Clemens, Michigan 48043
Tel.: (313) 469-5225

615 Water Street
Port Huron, Michigan 48060
Tel.: (313) 987-2000

Congress of the United States
House of Representatives
Washington, D.C. 20515

September, 1983

Mr. James Rosenfeld, President
Television Division
CBS
51 West 52nd Street
New York, New York 10019

Dear Mr. Rosenfeld:

A little over a year ago, I wrote to CBS, urging you to explore the possibility of providing closed captioned programming for the deaf and hearing impaired community. Being a member of the Board of Trustees for Gallaudet College, the only liberal arts college for the deaf and hearing impaired in the world, I had long been concerned about the special problems of the deaf and hearing impaired. I held a community townhall meeting in my district especially for the deaf and hearing impaired to discuss problems particular to them. Over 400 people battled the awful weather to attend. A frequently cited problem was the way that society has alienated its deaf and hearing impaired community. Closed captioned programming permits television to be a vehicle that facilitates their integration into a hearing oriented society by providing news, entertainment, and other information. I am writing to you today because it is my understanding that CBS still does not provide, nor have you any plans to provide, closed captioned programming.

I was informed by Albert Crane's office that CBS is broadcasting a captioning system of its own, called Extravision. I was also given the names of several companies that were manufacturing the teletext devices that could decode CBS's Extravision captions. However, two days and countless long distance phone calls later, I was forced to come to the conclusion that these decoders, which CBS seems to believe are readily available, are as hard to find as a needle in a haystack.

I had called the Headquarters of both GE and RCA, two of the companies that were supposed to be manufacturing the teletext decoders. After being transferred from the Information Department to the Telecommunications Department to the Home Video Department and finally to the Research Department, I was given the same answer by both companies: "No one here has ever heard of the decoders." I called Panasonic, another company that is supposed to be manufacturing the teletext decoders. The good news was that Panasonic was familiar with the devices; The bad news was that the very earliest that Panasonic will begin producing the decoders is June of 1984. The even worse news was that Panasonic has not yet decided if they will produce the decoders at all. Sony, the last company that I contacted, not only was familiar with the devices, they also had some available, 1 or 2 to be exact. They were prototype samples and were

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not available for sale, since Sony, like Panasonic, has not yet decided to produce these decoders. Moreover, these decoders were not developed for decoding Extravision captions, although they are able to do that. They were intended to be sold to brokerage houses that needed up-to-date market information. Accordingly, they were intended to be sold in quantities of 20,000 and their retail selling price is $995.

I called Mr. Crane's office and asked the following question: "How is one supposed to see Extravision captions, if the necessary decoders are not available?" I was told that providing the decoders was not CBS's service. CBS's job was to provide the software. It was up to the other companies to provide the hardware. One then is forced to wonder why someone would go to all the trouble and expense of marketing software if the necessary hardware was not being produced.

Even if the decoders were being produced, which they are not, and even if they were reasonably priced, which they are not, I would still object to CBS's Extravision system. Extravision is not a universal system, and therefore, could not be received by the over 70,000 Line 21 decoders which have already been purchased by deaf and hearing impaired people. Each week these devices provide almost 300,000 Americans with over 40 hours of closed captioned programming on ABC, PBS, and NBC. In fact, the graduating class at Virginia's School for the Deaf and Blind dedicated the 1983 yearbook to the Telecaption decoder for "opening up a new world to the deaf".

In 1973, the U.S. Congress passed the Vocational Rehabilitation Act, commonly known as the Handicapped Civil Rights Act. With the passage of that Act, the federal government assumed responsibility for guaranteeing handicapped citizens free and open access to public facilities and a public life. But government needs the cooperation of American business in order to insure that handicapped citizens are accorded free and open access to all aspects of American life.

I believe that CBS has a corporate responsibility to provide closed captioned programming for the deaf and hearing impaired members of our country. On behalf of the deaf and hearing impaired community nationwide, I ask that you favorably consider closed captioning some of your programs in the future.

Sincerely,

David E. Bonior
Member of Congress

Carl Levin
United States Senator

DEB/kc

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CBS
TELEVISION
NETWORK

A Division of CBS Inc.
51 West 52 Street
New York, New York 10019
(212) 975-4805
Tony C. Malara, President

Dear Congressman Bonior: October 24, 1983

Thank you for your letter of September 23 regarding closed captioning for the hearing-impaired.

For a number of years, CBS has been involved in the development of a broadcast teletext system which will be a unique in-home communications tool for all viewers, and which will also include closed captioning for the hearing-impaired. On April 4 of this year, CBS began its national teletext service (called EXTRAVISION), which provides a wide range of information services and closed captioning of selected programs over the CBS Television Network.

We have declined to participate in the so-called "Line 21" system since its early development stages. We believe that "Line 21" is an obsolete system, and we did not want to encourage the purchase of decoders which would soon be incompatible with better and more comprehensive teletext systems. Now that CBS, NBC and PBS are using what is called the "North American Broadcast Teletext Standard" (NABTS) for transmission of their teletext services, equipment manufacturers have real incentives to build and market decoders for the mass market. Sony, Panasonic and General Electric have indicated that NABTS decoders will be available in 1984.

CBS believes that since teletext can be used both by hearing-impaired viewers, and the rest of the television audience, it is a mainstream service that will realize economies of scale and become affordable to all. As this occurs, teletext will serve as a broad information service for the hearing-impaired, providing detailed news, weather, financial,

entertainment and other coverage. With this comprehensive service now becoming a reality, CBS hopes that the leadership of the deaf community will join with us in helping to advance this communications revolution for the hearing-impaired.

I regret any inconvenience you may have been caused with respect to the information you received regarding the availability of decoders. We continue our efforts with manufacturers in an effort to bring decoders to the marketplace.

I hope the foregoing is responsive to the request in your letter of September 23.

Sincerely,

Congressman David E. Bonior
Congress of the United States
House of Representatives
1130 Longworth House Office Building
Washington, DC 20515

Mr. WALGREN. Mr. Bates.

STATEMENT OF HON. JIM BATES, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. BATES. Mr. Chairman and members of the subcommittee, I appreciate the opportunity to testify before the Subcommittee on Science, Research and Technology at its oversight hearing on developing technologies for television caption—captioning benefiting the hearing impaired is much appreciated. I might say that Congressman Bonior's statement said many of the things I will repeat, and he said it very well, and I want to thank him for inviting me to become involved in this issue.

Earlier this fall, I and my colleague, Congressman Dave Bonior, attended the National Association for the Deaf demonstration against CBS refusal to provide closed captioned television programs for the hearing impaired.

And at that time, I promised to do what I could as a member of the House Telecommunications Subcommittee to help the plight of the 15 million Americans with significant hearing losses.

To date, I have asked CBS—to no avail—why it has refused to join the other major networks as well as the Public Broadcasting Service in providing captions through a system compatible with existing decoders.

I have also discussed this issue with the chairman of the House Energy and Commerce Subcommittee on Telecommunications, Congressman Tim Wirth.

As background, in 1979, ABC, NBC, and the Public Broadcasting System agreed to incorporate closed captioning in their program schedules. And at that time, CBS promised to develop its own system known as teletext.

Although the number of hours of closed caption television has increased from 16 hours in 1980 to 40 hours in 1983, the hearing impaired still do not have the luxury of watching television on all three major networks.

This is true primarily because CBS refuses to join the other networks in providing closed captioning on line 21 of the 525 lines making up the television picture. CBS contends it is in the process of developing a teletext system which would transmit words and graphics to home television sets equipped with special decoding devices.

In the meantime, the Federal Communications Commission issued a rule reserving line 21 for closed captioning for 5 years. During the 5-year grace period, interested parties, including the Congress, are expected to observe the development of both teletext and the line 21 captioning system.

And as this subcommittee knows, the Federal Communications Commission's March 1983 rule left it to the broadcasters to decide what system they wanted to use.

While many people understandably argued that to require broadcasters to use a specific decoder would illustrate how the Federal Government unfairly intervenes in the private sector. I, of course, do not buy this argument.

As users of the public's airwaves, without paying any spectrum fee, the broadcasters under sections 303, 307, and 309 in title 3 of the Communications Act of 1934 are required to meet the public interest of convenience and necessity standard.

And, furthermore, the recent appropriations of an additional $2.5 million to the Department of Education for expanding closed captioning illustrates the Congress interest in this issue. This amount increases to $14 million, the Federal Government's commitment.

Even if CBS develops the teletext system, I am concerned that it would not be in the best interest or convenience of the hearing impaired to have to purchase two decoders in order to watch television on the major stations.

As it is now, decoders are about—add about $100 to the price of any new color television and cost from $250 to $290 for an adapter suitable for a used television.

To date, approximately 70,000 line decoders have been purchased. And because many of the decoders are used in institutions, an average of 4.15 viewers make use of each decoder, according to the National Captioning Institute.

Although CBS's teletext decoder is not yet on the market, I have been informed that its price tag is expected to range from $1,300 to $3,000.

Rather than increase the burdens on the hearing impaired, I would prefer the networks develop one decoding system. If need be, I am prepared to introduce legislation effectively requiring the Federal Communications Commission to issue regulations imposing specific obligations on the licensee to meet the special needs of the hearing impaired.

I appreciate the opportunity to testify today and express my continued commitment on behalf of the 15 million hearing-impaired individuals in this country.

Thank you.

Mr. WALGREN. Thank you, Mr. Bates.

[Letter dated September 29, 1983, follows:]

JIM BATES
44th DISTRICT, CALIFORNIA

Congress of the United States
House of Representatives
Washington, D.C. 20515

September 29, 1983

Mr. Thomas Wyman
President
CBS
51 West 52nd Street
New York, New York 10019

Dear Mr. Wyman:

The National Association of the Deaf held a demonstration in Washington, D.C. yesterday to focus attention on the importance of closed captioning. Designed to open the world of television to the hearing impaired and the deaf, closed captioning allows for the audio portion of a television program to be printed in text on the television screen.

Although the two other major networks as well as the Public Broadcasting Service agreed in 1979 to incorporate closed captioning into their program schedules, the National Association of the Deaf contends that CBS has refused to join the other networks in providing captions through a system compatible with existing decoders. We would appreciate an explanation of CBS's position on this issue.

Sincerely,

Timothy E. Wirth

JIM BATES

David E. Bonior

1632 Longworth House Office Building, Washington, D.C. 20515 (202) 225-5452

CBS
TELEVISION
NETWORK

A Division of CBS Inc.
51 West 52 Street
New York, New York 10019
(212) 975-4805
Tony C. Malara, President

Dear Congressman Bonior: October 19, 1983

Thank you for your letter of September 29 regarding closed captioning for the hearing-impaired.

For a number of years, CBS has been involved in the development of a broadcast teletext system which will be a unique in-home communications tool for all viewers, and which will also include closed captioning for the hearing-impaired. On April 4 of this year, CBS began its national teletext service (called EXTRAVISION), which provides a wide range of information services and closed captioning of selected programs over the CBS Television Network.

We have declined to participate in the so-called "Line 21" system since its early development stages. We believe that "Line 21" is an obsolete system, and we did not want to encourage the purchase of decoders which would soon be incompatible with better and more comprehensive teletext systems. Now that CBS, NBC and PBS are using what is called the "North American Broadcast Teletext Standard" (NABTS) for transmission of their teletext services, equipment manufacturers have real incentives to build and market decoders for the mass market. Sony, Panasonic and General Electric have indicated that NABTS decoders will be available in 1984.

CBS believes that since teletext can be used both by hearing-impaired viewers, and the rest of the television audience, it is a mainstream service that will realize economies of scale and become affordable to all. As this occurs, teletext will serve as a broad information service for the hearing-impaired, providing detailed news, weather, financial, entertainment and other coverage. With this comprehensive service now becoming a reality, CBS hopes that the leadership of the deaf community will join with us in helping to advance this communications revolution for the hearing-impaired.

I hope the foregoing is responsive to the request in your letter of September 29th.

Sincerely,

Tony C. Malara

Congressman David E. Bonior
Congress of the United States
House of Representatives
1130 Longworth House Office Building
Washington, DC 20515

All right, well, let's turn—do other members have anything they would like to add at this point?

Mr. BATEMAN. No, Mr. Chairman.

Mr. WALGREN. Let's turn, then, to the first panel of witnesses, and let me say at the outset that—Mr. Harkin.

Mr. HARKIN. I wonder, Mr. Chairman, if I just might have a little colloquy with my colleagues on—on this issue who, by the way, I just want to compliment them both for having an interest in this and pursuing it. I wish more Members of Congress would exhibit the same interest as both Congressman Bates and Congressman Bonior have in this—in this issue.

I know from just listening to you and reading your testimony that your interest is basically the same as mine, and that is providing the widest use or the lowest possible cost to the hearing impaired in this country, and to get them the best kind of service.

Now, again, the—the issue that I raised in my opening remarks, and one that, Jim, I just particularly want to direct to you, is that, yes, we in Congress have indeed expended a lot of money for closed captioning. In fact, I recently had a colloquy on the House floor with the chairman of the committee, Mr. Natcher, to insure that the $2.5 million was indeed used for closed captioning.

I guess my concern is that—I have been on the Science and Technology Committee now 9 years, and if—if one thing I have become convinced of is that we here on the committee, just as I think most Members of Congress, are not the best judges of what technology we ought to really put our money in. We just don't have that kind of resource to determine that.

Now, to the extent, as I said, that we want to meet the immediate needs of the hearing impaired, that's why we moved this closed captioning and that's why I tried to put money into it. But what—what concerns me, and I don't know—I don't have the answer to this: Are we going down a road that is a short term technology and pumping a lot of money into it when there is a longer road, wider road, cheaper road, in a new technology? And will we, because of our actions, push off the effective date when we go down that new road of new technology? That's all I'm concerned about.

Mr. BONIOR. Mr. Chairman, if I might respond. I think those are excellent articles—arguments, and particularly in a committee like Science and Technology where you are so involved in—in the technological aspects. But I—my own position is that it's—it is a matter of commitment, it's a matter of values. And that I think we have or can develop the technology and a reasonable price. And if we are going to leave it up to the broadcasters to do it, that's fine, because if they have the expertise and the talent to do it, then they should do it.

But I think there has to be a deadline in meeting that commitment. And I think it has gone on far too long and the way it has proceeded with a major network, one-third of the television viewing not being available to the hearing impaired is totally unacceptable. And I am as prepared as you are to argue the—you know, the best course in the long run.

But in the meantime, 15 million people, for years, have been denied something that everyone else takes for granted. And I think

it's just totally unacceptable as a basic value of our society something that we can live with.

Mr. HARKIN. I—I think, excuse me, Jim. I think that, you know, I was enthusiastic when we finally got the decoders out. And NCI and others, Sears, were telling us that they expected a hundred thousand in the first year—the first year, a hundred thousand—and then it would go up after that.

Here we are—what? Four, five, four years later, and we only have 72,000, in four years. Now, it is a chicken-and-egg argument. A lot of deaf people I know say I'm not going to buy it because you can't watch anything on it because there are not very many programs. The broadcasters say, well, we don't have any programs because not many people have them, you know; so I don't know which comes first.

Mr. BONIOR. Can I respond to your——

Mr. HARKIN. Pardon?

Mr. BONIOR. May I respond to your question?

Mr. HARKIN. Yes; I'm sorry.

Mr. BONIOR. If we are to walk along this wider new road, I think what we ought to do is walk together. And that's not happening. CBS, and to a very large extent NBC, and I—I want to be as tough as I can this morning because I don't think I've gotten their attention, and I don't think the deaf community has gotten their attention—have been corporately irresponsible. Four years and nothing. We keep—we've been told time after time that they are going to put something on the market and yet we've seen nothing.

And during that 4-year period, with the tremendous profits of both of these—well, perhaps not as much with NBC, but certainly at CBS, they have not seen fit to invest and make the effort to—to provide the access to the hearing impaired.

Now, with respect to your concern, and I share it—only 72,000 sold in 4 years—that is a concern. We ought to look at the Belgians and we ought to look at the English, and find out how they have been so successful in developing and in marketing, and getting the hearing impaired to purchase as many as they have.

You have an excellent idea that I support and we will work with you on in the coming months in this Congress—and that's to get the Ways and Means Committee to deal with some type of tax advantage for those who purchase decoder machines.

I know the chairman of that committee has not been as cooperative as he—we would like him to be at this point, but I think we can—we can work on him. I think he is flexible, and I plan to talk on him—talk to him about it.

So I think—I guess the thing that I would like to leave the committee with is, No. 1, the networks have to walk together—whether it's a narrow road or a wide road, no matter how long it is. We can't have them divided on this issue with respect to access.

And, second, we have got to make—as you point out—this available to more and more people who have hearing-impaired difficulties.

Mr. WALGREN. Thank you, Mr. Bonior.

Are there other questions or areas that members want to pursue?

Well, let me, on behalf of the committee, express our appreciation for your contribution this morning. And we look forward to working with you on the—this area.

Well, let me then call the first panel. And at the outset, I would like to say that we have a full slate this morning. The numbers of witnesses which we need to hear that deserve to be heard, and that the committee is here to hear, because we are your servants, is long. And that means that if we are to get through it, somehow each of us has to extend to the other some consideration as to time.

We did indicate to the witnesses that we were looking for 5 to 10 minutes of—of presented prepared testimony. We do have some lights there which you will see out of the corner of your eye, will last green until I don't know how long, and then toward the 8-minute, 9-minute mark, they will go red. And when that red light comes on, if you would, in consideration of the time constraints that we have—and we don't have this room this afternoon, so we are going to have to confine our hearing to the morning—if you would think of what else it is you really want to communicate to the committee for the record, and—and try to limit yourself to that at that point.

Also know that your written testimony will be made part of the record and incorporated in the—the transcript of these hearings. So you can develop your points, if you choose, even after you've testified. We will be happy to have your written testimony reflect the fullest presentation that you would like to make.

So with that, let me call the first panel: Joseph Flaherty, the vice president for Engineering and Development of CBS Broadcast Group; Barbara Watson, the general manager of NBC Teletext; Peter Downey, the vice president for Program Administration and Information of PBS; and Leonard Maskin, the vice president of ABC's Broadcast Group, who will be accompanied, I understand, by Richard Stubbe, who is the director of TV Network Operations.

Let me ask you folks to come forward. We are going to have a demonstration, I understand. Is it CBS that has a—one demonstration, and ABC the other? So we will proceed through, and I think perhaps in that order. I don't want to put anybody to a disadvantage as to the time of the demonstration but it would seem to me that we should just proceed with what you would like to present in that order.

And so let me ask, Mr. Flaherty, proceed, and know that your written statement will be part of the record; you are invited to summarize or communicate to the committee as you feel most effective. And we appreciate your coming to the hearing, and your participation in it. Mr. Flaherty.

STATEMENTS OF JOSEPH A. FLAHERTY, VICE PRESIDENT, ENGINEERING AND DEVELOPMENT, CBS BROADCAST GROUP, NEW YORK, N.Y.; BARBARA L. WATSON, GENERAL MANAGER, TELETEXT, NATIONAL BROADCASTING CO., INC., NEW YORK, N.Y.; PETER DOWNEY, SENIOR VICE PRESIDENT, PROGRAM ADMINISTRATION AND INFORMATION, PUBLIC BROADCASTING SERVICE [PBS], WASHINGTON, D.C.; AND LEONARD E. MASKIN, VICE PRESIDENT, ABC BROADCAST GROUP, AMERICAN BROADCASTING COS., INC., ACCOMPANIED BY RICHARD W. STUBBE, DIRECTOR, TV NETWORK OPERATIONS

Mr. FLAHERTY. Thank you very much, Mr. Chairman.

I am Joseph Flaherty, the vice president of Engineering and Development for CBS. And on behalf of CBS, I welcome this opportunity to participate in these hearings with you.

I can absolutely assure you that CBS is very deeply concerned about television service for the hearing-impaired community and particularly about program captions.

And it is for that reason that we have dedicated our resources to insure that the method adopted to serve that community is the one that maximizes the service at the lowest possible cost for both the hearing impaired community as well as the public at large.

Teletext is in fact that service. It's that service because it supplies both an electronic magazine of updated and important information and superior captions for the hearing-impaired.

It is in fact the teletext system that is used abroad, in England and Belgium referred to by Congressman Harkin.

Even though CBS does not manufacture or sell professional consumer broadcast equipment, CBS has always been dedicated to the improvement in quality of the technology associated with broadcasting services.

Through its New York Engineering Department and its Technology Center in Stamford, Conn., CBS developed the first lightweight miniature camera—versions of which are used by broadcasters throughout the world for electronic news gathering and sports reporting, the presentation of that very information referred to as so vital to the public today.

As we speak, CBS is standing at the forefront in the development of high definition television—a technology that promises to bring wide-screen cinema quality television to the American home.

The list of such contributions goes on but my point is that CBS is committed to the development of a new technology that has—and has led the U.S. development of teletext.

Extravision is, of course, just a name; not a unique system. CBS uses teletext—the same system as that used internationally with the broadcast of magazines and closed captioning.

This system is capable of transmitting an entire electronic magazine along with captions for the hearing impaired simultaneously with the normal picture.

CBS is firmly and deeply convinced that teletext presents the best method for achieving the goal of maximizing service at the lowest possible cost to the hearing-impaired community as well as the public at large. Why?

Teletext is more than a program-related captioning service, although it is in fact a superior method of doing that as well. It brings a visual information service on demand to the viewer in the form of an electronic magazine, each of which can embody several hundred pages.

As CBS has developed it, the teletext magazine service will be aimed at both hearing-impaired viewers and the general public. This mass audience will influence the volume of decoder sales and thus will not only reduce the cost of decoders to the hearing-impaired community by spreading that cost over millions of units, but will also bring hearing-impaired viewers into the mainstream of visual communications.

In addition, the magazine service will be of immediate benefit to the hearing impaired since, on demand, it can provide instantaneous, up-to-the-minute news and information, both local and national.

Such real-time visual information is not now available to the hearing-impaired viewers.

In the teletext system, magazines and captions are transmitted free to the home with the normal picture. This permits viewers to select either the television programs, or the program and captions, or pages from the teletext magazine. In fact, one of the most important features of teletext is its ability to provide more than one set of visual program-related captions. These caption channels can be used to provide a range of reading rates for the hearing-impaired viewers or, indeed, multiple language captions.

Apart from the enormous flexibility in captioning, teletext, as I have stated, provides instant access to local weather, up-to-the-minute news and emergency information. These features are of particular importance to the hearing impaired because other sources of such information are generally aural services, such as radio and the telephone. Visual information of this type is not generally available on demand except via teletext. Specifically, this is how the system works.

Teletext information is converted into a high speed digital code at the rate of 5.7 million bits per second. And that code, as we will demonstrate, is transmitted as pulses hidden in the vertical blanking interval—that's this black bar at the top of your picture.

[Visual demonstration.]

Mr. FLAHERTY. The teletext encoded signal is then broadcast in the normal way and the home viewer has the option of watching the picture or, with a decoder equipped receiver, the teletext and captioning.

Now to demonstrate this, I would like to direct your attention to the monitors where we will misadjust the picture to expose the black bar and make the digitized teletext pulses visible to you in the center of the screen.

[Visual demonstration.]

Mr. FLAHERTY. You can see the black bar with the flashing black and white dots which represent the digital coded information going out on several lines of that vertical interval.

Now, this CBS teletext service is known as extravision, and is unique only in the name. And I would like to make three brief points about that before we demonstrate it.

First, the introduction of extravision was preceded by more than 4 years of technical field and operating tests, initiated by CBS, first in St. Louis at KMOX-TV, where we determined that the teletext signal would work in the U.S. broadcast environment.

And, second, CBS's extravision service became operational April 4, 1983. And CBS is offering that service now and it has in fact been cleared and is being broadcast by 85 percent of all the CBS affiliated stations. This is 167 stations.

Third, extravision is a national service backed up by local stations which may insert local content to further broaden the range of services offered to teletext viewers.

On that point, I'm happy to tell you today that the CBS affiliate in Charlotte, N.C., WBTV, has announced that it has already purchased teletext origination equipment and will soon begin to provide a local teletext service.

Moreover, CBS and the affiliates are by no means the only broadcasters interested in the development of teletext. As early as 1981, both NBC and PBS station KCET-TV cooperated in a joint teletext audience market test with CBS in Los Angeles. Today, NBC offers a service to its affiliates similar to the CBS extravision.

Tests have been conducted by Westinghouse, Knight Ridder, Times/Mirror, and the Canadian Broadcasting Corporation, to name only a few. And all of these are using a teletext system known as the North American Broadcast Teletext specification (NABTS), or its videotex counterpart.

Now the pages you will see in the brief demonstration are representative of different types of information that might appear in an extravision magazine as it is presently being fed today to the entire CBS television network and broadcast by our affiliates.

Here in Washington, extravision can be seen on network programing over station WDVM-TV.

Now, since teletext pages must be selected by the viewer, Mr. Seidell, sitting in the front of the room here, will operate a single key pad of the type the consumer would have, which controls the teletext decoders at each of the four monitors in the front of the room. By pressing the text button on the decoder key pad, Mr. Seidell will switch from the television program to the teletext magazine.

[Demonstration.]

Mr. FLAHERTY. Now, as in most magazines, the first page is an index page showing the number of the various sections making up the magazine. By——

Mr. HARKIN. There are a lot of people in the audience watching. You might do it a little slower. The interpreters are racing to keep up with you.

Mr. FLAHERTY. Sorry, I'm nervous about the time. Thank you, sir.

By entering appropriate page numbers into the keypad, we can call up the news headlines page. While that's up you might notice that sometimes there is a slight delay in the appearance of the page. This is because the pages are transmitted serially and the amount of time required to acquire any given page depends on the number of pages in the magazine, their complexity, and the number of vertical interval lines being used to transmit them.

Typically, the delay is about 10 seconds for a 50-page magazine.

Now, news headlines such as these can be updated instantly providing viewers with the full time and the real time visual news service—something unavailable today to the hearing impaired community.

The next page shows what a local weather report might look like. This one is for the city of Buffalo. The hearing impaired have few if any other methods of obtaining this kind of up-to-the-minute weather information.

Now, information like school closing announcements during snowstorms, usually available only on the radio, is readily available on teletext as shown on this page—more timely and local information.

Mr. HARKIN. Excuse me, Mr. Flaherty. Now, what you are saying is that someone in the studio or someplace would be typing this in and instantaneously sending it out as digital information appearing then on the screen?

Mr. FLAHERTY. Yes, sir.

Mr. HARKIN. So it is real time information?

Mr. FLAHERTY. Yes, sir; it is updated every few minutes, sir.

Now, teletext can also play games and educate. This is a cover page for children—a series of children's games that follow then on subsequent pages. And this page happens to be an example of the typographic quality that can be achieved. And that graphic quality, of course, is important in conveying the information itself.

[Demonstration.]

Mr. FLAHERTY. Now, an important attribute of teletext is its ability to provide supplemental program-related information. This page, for example, details the CBS Library of Congress "Read More About It" project. It was prepared to complement the showing of the CBS movie "Bill on His Own" which is broadcast tonight, by the way.

On this and on subsequent pages, interested viewers were given a bibliography of reading material related to the movie.

This page provides a listing of CBS programs that will be broadcast with teletext captions. The viewer is also given instructions on how to enter the teletext caption mode. We will talk more about captioning in a second.

[Visual demonstration.]

Mr. FLAHERTY. The delays are the access time, delays of the system.

This page will show a typical billboard of local community activities.

Mr. HARKIN. Now, again, what you would have is the viewer would have a guide or something to tell them what to punch on the key to bring up this, right?

Mr. FLAHERTY. Yeah, the first page of the magazine, like most, is in fact an index page.

Mr. HARKIN. Yes.

Mr. FLAHERTY. So you always go to the index and it would say, for example, community activities, page 22, and you punch——

Mr. HARKIN. Punch that page 22 and it comes on the screen?

Mr. FLAHERTY. Yes, sir.

Mr. HARKIN. I understand.

Mr. FLAHERTY. Now, teletext can also be an instant source of emergency information. This page lists emergency phone numbers and the information on this change—page can be changed to respond to specific emergencies. Again, there's no way to obtain such information today visually.

Now, all of the attributes that have been used in the creation of these pages can be brought to bear in the creation of program-related captions.

Teletext is capable of providing multiple sets of program-related captions, each transmitted simultaneously with the program and each individually selectable by the viewer at home.

These different caption sets might be used to provide captions in a range of different reading speeds or to provide captions in a foreign language.

Teletext provides tremendous flexibility in the creation of dynamic and comprehensive captions allowing a range of color combinations plus special illustrations and positioning of the captions on the screen how to ease speaker identification.

To demonstrate some of these capabilities, we would like to show you a segment of the Dallas program which is regularly broadcast each week by CBS with a set of teletext captions. These are prepared by the caption center, WGBH in Boston.

Now, for today's demonstration we've added two extra sets of captions to make a total of three sets to demonstrate the different modes.

Mr. HARKIN. Can I ask you—just before you start that—how long is this? How many minutes?

Mr. FLAHERTY. Oh, it's about 3, 4 minutes.

Mr. HARKIN. OK, fine.

Mr. FLAHERTY. Normal program captions, which is what you will see first, are edited to condense the dialog for easier reading. The second set contains a verbatim transcript of the program. And, finally, the third set of captions are in Spanish. We will begin with the picture captions and sound, and after a few seconds, we will cut the sound to simulate the viewing conditions of the hearing-impaired community. We can roll the tape, please.

[Visual demonstration.]

Mr. FLAHERTY. Now we will go without the sound for a bit to simulate the actual conditions encountered by the hearing impaired.

[Visual demonstration.]

Mr. FLAHERTY. Now this is the verbatim captioning. This is the captioning of the entire dialog portion of the program.

[Visual demonstration.]

Mr. FLAHERTY. Obviously, a higher reading speed but yet readable.

And these sets of captions all go simultaneously with the common teletext magazine or extracted at will by the viewer.

Mr. HARKIN. What you are saying is that you can have it in Spanish and in English, simultaneously?

Mr. FLAHERTY. Yes, sir. And now you are seeing the Spanish captions. And you have the high speed and the low speed captions simultaneously.

[Visual demonstration.]

Mr. FLAHERTY. Well, to reiterate, the Extravision service has been on the air since April 1983, transmitting a 50-page magazine to the network and selected captioned programs every week.

The EIA, North American Broadcast Teletext specification, was approved by the EIA October 24, 1983. And this developing service will see an ever-increasing number of decoders available for both professional and consumer use during 1984 and 1985. Prototype decoders are in place. More of these are available and can be purchased for station and professional use.

Mr. DYMALLY [presiding]. Mr. Flaherty? Mr. Flaherty, just 1 minute, please. You are on page 5; is that right?

Mr. FLAHERTY. Nine, sir.

Mr. DYMALLY. Yet in your testimony before the committee, what page are you on now?

Mr. FLAHERTY. Page 9, sir.

Mr. DYMALLY. Oh, 9, OK. Just—we just have 7 in this. How much more do you have?

Mr. FLAHERTY. Oh, I'm sorry, it's page 5 in your copy, double-spaced there.

Mr. DYMALLY. OK, fine.

We have to leave for about 20 minutes, 15 or 20 minutes.

Mr. HARKIN. I will sit here until Doug gets back.

Mr. DYMALLY. OK, fine. We are going to be rotating. The chairman has gone to vote and he hopes to come back before Mr. Harkin will leave. OK, so proceed.

Mr. HARKIN. Go ahead.

Mr. FLAHERTY. OK. The critical issue mentioned before of economically priced consumer decoders depends on mass production and that, in turn, depends on the availability of complete sets of what are called very large-scale integrated circuit chips.

Some of these integrated circuit chips are now available from Texas Instruments, Thomson-CFS in France. The complete set of very large-scale integrated circuit chips are being designed by several laboratories around the world.

Like most new technologies, there have been frustrations in developing teletext. I am sure that the hearing-impaired community has felt those frustrations as well. But we now estimate that the decoders will be available in the mass market in roughly 18 to 24 months and that built-in decoder prices in receivers will be in the range of $150.

Let me conclude with two brief points. First, teletext is the captioning method which has been chosen by the rest of the world, as you mentioned earlier.

The United States is thus far the exception. Canada began with line 21 but, unlike the United States, has adopted a national teletext standard. That standard is the same one chosen by CBS and NBC, namely, the NABTS. Thus, in the future, the Canadians will also be able to enjoy the additional flexibility of teletext captioning.

Second, teletext can do all that line 21 can do and, of course, much more. All of this through a single teletext decoder, hearing-impaired viewers as well as the general public, will be able to enjoy not only program-related captions but also pages of up-to-the-minute information in a service which is dynamic, responsive, expandable, and designed for today as well as the future.

In the view of CBS, there can be no doubt but that teletext is the captioning technology.

Thank you, sir.

[The prepared statement of Mr. Flaherty follows:]

BEFORE THE U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE AND TECHNOLOGY
Statement by JOSEPH A. FLAHERTY
Vice President of Engineering and Development
CBS/ Engineering and Development
November 9, 1983

Mr. Chairman on behalf of CBS, I welcome the opportunity to participate in these Hearings. CBS is deeply concerned about television service for the hearing-impaired community and about program captioning. For that reason, we want to be sure that the method adopted to serve that community is the one that maximizes service at the lowest possible cost to the hearing-impaired community as well as the public at large.

Even though CBS does not manufacture or sell professional and consumer broadcast equipment, CBS has always been dedicated to improvement in the quality of the technology associated with broadcast services. Through its New York Engineering Department and its Technology Center in Stamford, Connecticut, CBS developed the first light-weight color mini-cam, versions of which are now used throughout the world for electronic news gathering and sports reporting. CBS also developed computer video tape editing, and with Ampex, developed the electronic still store and the first practical electronic graphics system. As we speak, CBS is standing at the forefront in the

development of high definition television, a technology that promises to bring wide-screen cinema quality television to the American home. The list of such contributions goes on but my point is that CBS is committed to the development of new technology and has led the U.S. development of teletext. That is, a system capable of delivering electronic magazines and captioning for the hearing-impaired simultaneously with the normal television picture.

CBS is firmly and deeply convinced that teletext presents the best method for achieving the goal of maximizing service at the lowest possible cost to the hearing-impaired community as well as the public at large. Why? Because teletext is more than a program-related captioning service, although it is a superior method of doing that as well. It also brings a visual information service - on demand - in the form of multiple electronic magazines, each of which can embody as many as 200 to 300 pages.

As CBS has developed it, the teletext magazine service will be aimed at both hearing-impaired viewers and the general public. The mass audience will influence the volume of decoder sales and thus will not only reduce the cost of decoders for the hearing-impaired community by spreading the cost over millions of units, but also will bring hearing-impaired viewers into the mainstream of visual communications. In addition, the magazine service will be of immediate benefit to the hearing-impaired since--on demand--it can provide instantaneous, up-to-the minute news and information, both local and national. Such

real-time visual information is not now available to hearing-impaired viewers.

In the teletext system, magazines and captions are transmitted free to the home with the normal picture. This permits viewers to select either the television program, or the program and captions, or pages from the teletext magazine. In fact, one of the most important features of teletext is its ability to provide more than one set of visual program-related captions. These caption channels can be used to provide a range of reading rates for hearing-impaired viewers or multiple language captions.

Apart from the enormous flexibility in captioning, teletext, as I've stated, provides instant access to local weather, up-to-the minute news and emergency information. These features are of particular importance to the hearing-impaired because other sources of such information are generally aural services, such as radio and the telephone. Visual information of this type is not generally available on demand except via teletext. Specifically, here's how the system works.

Teletext information is converted into a high speed digital code at a rate of 5.7 million bits of information per second. That code, as we will demonstrate in a moment, is transmitted as pulses hidden in the vertical blanking interval; that is, the black bar at the top of your television screen. The teletext encoded TV signal is then broadcast in the normal manner. The home viewer has the option of

watching the normal picture or, with a decoder equipped receiver, watching the teletext and captioning information.

To demonstrate this, I'd like to direct your attention to the monitor where we will mis-adjust the picture to expose the black bar and to make the digitized teletext pulses visible.

[DEMONSTRATION]

The CBS teletext service is known as Extravision™. I'd like to make three brief points about that service before we demonstrate what it can do.

First, the introduction of Extravision was preceded by more than 4 years of field operating tests, first initiated by CBS at KMOX-TV in St. Louis. Those tests confirmed that the teletext signal works well in the current U.S. broadcast environment.

Second, CBS's Extravision service became operational April 4, 1983. CBS is offering the service now and it is cleared by 85% of the CBS affiliated stations. That represents 167 stations.

Third, Extravision is a National Network service backed up by local stations which may insert local content to further broaden the range of services offered to teletext viewers. On that point, I'm pleased to report that the CBS affiliate in Charlotte, North Carolina WBTV, has announced that it has already purchased teletext origination equipment and will soon begin to provide local teletext content.

Moreover, CBS and CBS affiliates are by no means the only broadcasters interested in the development of teletext. As early as 1981, both NBC and KCET-TV cooperated with CBS in a joint teletext audience market test in the Los Angeles area. Today, NBC offers a service to its affiliates similar to CBS Extravision™. Tests have been conducted by Westinghouse, Knight Ridder, Times/Mirror and the Canadian Broadcasting Corporation, to name only a few. All of these services are utilizing a teletext specification known as the North American Broadcast Teletext specification (NABTS), or its videotex counterpart. That system has been fully documented before the Electronic Industries Association's teletext Steering Committee and was unanimously accepted and approved as a recommended practice for Broadcast teletext. Let me now demonstrate Extravision™.

[DEMONSTRATION]

To reiterate, the Extravision™ service has been on the air since April 4, 1983, transmitting 50 pages and selected captioned programs. Since the EIA North American Broadcast Teletext specification has been approved as of October 24, 1983, this developing service will see an ever increasing number of decoders available for both professional and consumer use during 1984 and 1985. Prototype decoders are already in place. More of these are available and can be purchased for station and professional use.

Economically priced, consumer decorders depend on mass production and, that in turn, depends on the availability of the complete set of

very large scale integrated circuit chips. Some integrated circuit chips are now available from Texas Instruments and Thompson-CFS in France. The complete set of very large scale integrated circuit chips are being designed by several laboratories throughout the world.

Like most new technologies, there have been frustrations in developing teletext. I'm sure that the hearing-impaired community has felt those frustrations as well. But we now estimate that the decoders will be available to the mass market in roughly 18 to 24 months and that the built-in decoder price will be in the range of $150.

Let me conclude with two brief points. First, teletext is the captioning method which has been chosen by the rest of the world. The United States is thus far the exception. Canada began with line 21 but, unlike the U.S., has adopted a national teletext standard. That standard is the same as the one chosen by CBS and NBC, namely, NABTS. Thus, in the future, the Canadians too will be able to enjoy the additional flexibility of teletext captioning. Secondly, teletext can do all that line 21 can do and much more. Through a single teletext decoder, hearing-impaired viewers as well as the general audience can enjoy not only program-related captioning but also pages of up to the minute information in a service which is dynamic, responsive, expandable, and designed for today as well as the future. In the view of CBS, there can be no doubt but that teletext is the captioning technology.

EXTRAVISION™ DEMONSTRATION

The demonstration to be conducted in conjunction with the testimony offered by Mr. Flaherty will consist of a selection of pages from the Extravision™ Teletext magazine and a segment from Dallas featuring three different levels of program captions (normal captions, verbatim captions, and Spanish language captions).

Mr. HARKIN. Thank you very much, Mr. Flaherty, and without questioning let's go on to the next witness from—I'm sorry, as soon as I find my list here——

Ms. WATSON. Ms. Watson.

Mr. HARKIN. Oh, Ms. Watson, general manager, NBC Teletext. Ms. Watson, we have a copy of your statement, and without objection, it will be made a part of the record in its entirety. Please proceed as you so desire.

Ms. WATSON. Thank you.

Good morning. I am Barbara Watson. I have been general manager of NBC Teletext since it was organized in January of this year. As general manager, I am the executive with overall responsibility for NBC's national broadcast teletext service.

The subcommittee has invited us to appear to present our views on the existing and future technological systems for television captioning. While my background principally involves management, marketing and planning, I am somewhat familiar with the technical aspects of teletext.

What I want to do is start with how teletext works, because I think it will make it easier to see the difference—technical differences between line 21 and teletext captioning.

Broadcast teletext, which you have just seen demonstrated, is a system by which pages of text and graphic images are prepared, coded, packaged, cycled, and inserted into the vertical blanking interval of the video broadcast signal.

These pages can then be received, decoded, and viewed on the viewer's television set. The pages are continually cycled and retransmitted so that the viewer can access any individual page at his or her discretion with a minimum of delay.

The analogy often used to illustrate teletext is that of a slide carousel constantly turning, with the viewer's decoder grabbing the desired slide at the push of a button.

With the NABTS standard selected by NBC, CBS, and others, the page is coded into something like a computer language. When the decoder receives the code it translates it back into the original text and graphic image.

I think the important thing to remember is that teletext is a cyclic transmission continually providing access to what is essentially an electronic magazine. And that signal is carried simultaneously with the video picture.

Teletext, as you have seen, can be viewed separately from the video programing by pushing the text button and reading the magazine.

Teletext technology also allows the overlay of text on the video image carried on the main channel. There's——

Mr. HARKIN. Excuse me, Ms. Watson. I'm sorry.

Ms. WATSON. Sure.

Mr. HARKIN. I do have to go vote, and Mr. Walgren is not back but he should be back very shortly. Please continue your testimony. Staff will be here and Mr. Walgren should be back momentarily.

Ms. WATSON. Fine, thank you.

It is this process which provides the captioning capability in teletext.

The teletext caption, however, is in real time and is timed to be associated with the video signal to which it is linked. In teletext this is accomplished by preempting the teletext cycle and inserting the caption immediately into the vertical blanking interval.

The decoder recognizes the caption by a special code and when captioning is requested by the viewer, the text is overlayed on the video picture.

The closed captioning of programs through the use of line 21 of vertical blanking interval has some similar characteristics. Like the teletext system, the text that forms the caption is packaged separately from the video picture—transmitted as part of the total signal.

In both systems this results in overlaying the text on the video picture much as subtitles appear in many foreign films.

Line 21 technology uses a dedicated line in the vertical blanking interval while teletext captioning shares the lines allocated to teletext, currently lines 14, 15, 16, 17, 18, and 20, with other teletext programing.

The functions included in preparing and broadcasting line 21 and teletext captions are similar, but require different equipment.

In the line 21 system that NBC is currently using, captions are originally prepared and stored on a floppy disk by one of the organizations providing this service. NBC has to then merge these captions with its video signal before broadcasting the program. It is able to match the caption to the video frame by means of a time code which is used to synchronize the text with the picture.

Prior to broadcast, the video master and the time code, from which is called the uncaptioned master, are fed into a device called the simple encoder. A floppy disk reader is used to read the captions which have been prepared ahead of time.

The time code on the video triggers the extraction of the caption stored on the floppy disk and the caption data is then inserted into line 21 of the video signal. The video signal is then recorded onto another video tape which is now called the closed caption master. It is this tape which is then played at broadcast time.

NBC is experimenting with a system called live encoding which eliminates some of the manual steps involved, as I mentioned before. Under this method the captions would be prepared by a captioning organization and then transmitted via data communication lines to NBC, where they would then be inserted in real time into line 21 of the outgoing network feed. What you are essentially doing is eliminating the floppy disk and speeding up the process.

For teletext captioning, it is possible to use the same process for preparing the captions for inclusion within the teletext service as that used for line 21. The head-end broadcast equipment specified by NBC for teletext will include a captioning input in addition to the input that is required for the data of the cyclic teletext service.

Captions either coming from a floppy disk or from a data line, which is the process we just talked about of live encoding, would be formatted and inserted without delay into the outgoing video feed, with the caption given priority over the cyclic teletext data.

It is also possible to create and use precaptioned master video tapes with teletext by extracting and reinserting the teletext captions at broadcast time.

Line 21 captioning and teletext captioning produce the same result: transmitting text over the vertical blanking interval to special equipment attached to the television set which recognizes the data as a caption and overlays it on the television screen.

There are some differences. Teletext captioning uses a different transmission protocol, that is, the extra information that is placed around the text to allow communication with the box that's in the home. And it also shares the vertical blanking interval lines with other teletext data.

Line 21 captioning has its own transmission protocol and uses a single dedicated line in the VBI.

In teletext, captioning is a subset of an expansive text and graphic service using a teletext decoder which handles captioning as well as the broader teletext services. The line 21 adaptor simply provides access to line 21 captions.

The components of the decoder or adaptor, which is the in-home equipment, are similar. A tuner, which grabs the over-the-air signal before it reaches the television; something called a data slicer that breaks the vertical blanking interval portion of the analog signal into the on-and-off bits of a digital signal; the memory and logic to process that data; and a means to display the date on a television receiver.

NABTS, the North American Standard that CBS and NBC are using—the NABTS teletext decoder provides high resolution graphic capability and, as such, requires a more advanced display processor.

The teletext decoder must also handle a higher data rate because of the number of lines handled and because of the volume of data that is being cycled in teletext.

Teletext decoders also provide additional memory to buffer pages to improve the viewer's access time.

While I have not been personally involved, NBC has participated in the closed captioning of television programing on line 21 since it began on a national basis in 1980. NBC recognized from the outset that many operating and logistic problems existed. Nevertheless, NBC, ABC, and PBS each purchased, at substantial cost, the necessary capital equipment to engage in and transmit closed captioning, and arranged with the National Captioning Institute to purchase floppy disks with closed captions. NBC alone transmitted an average of 5 hours per week of captioned programs.

NBC's participation in this project was expressly conditioned on the representation that the hearing impaired public would obtain at least 100,000 decoders, or television receivers with decoders, a year. Meeting this expectation was expressly made of the essence in judging the success of the project.

The cumulative sales, however, have been far from that minimum. After an initial spurt of interest, sales of decoders leveled off to the point that after the first year the public had obtained fewer than 25,000 decoders. The project was clearly disappointing.

Almost 2 years later, fewer than 50,000 decoders had been sold, compared to the expected minimum of 200,000. Today, almost 4 years after the project commenced, we understand that there are fewer than 75,000 decoders—or less than 20 percent of expected demand.

Skeptical as we are of the extent of interest by the hearing impaired in closed captioning, NBC continues to transmit on line 21 closed captioning programs for which captions are supplied by producers, advertisers, and other outside sources.

Programs presently captioned include "Diff'rent Strokes," "Facts of Life," "Monday Night at the Movies," "The Shirt Tales," a program in our Saturday morning children's schedule.

Some of NBC's special programs are also captioned, as are reruns of previously captioned shows when that is technically possible.

NBC intends to continue to work with organizations for the hearing impaired and technical organizations to explore any new technology that offers promise.

Right now, teletext decoders are not available to the public, and high volume production to an extent where they would be economically attractive is not expected until 1985.

We are very closely watching developments in this new field. We feel that the development time to establish teletext market viability will allow time for the necessary experimentation with teletext captioning.

NBC appreciates the interest of this subcommittee in teletext and closed captioning, and the opportunity you have given us today to acquaint you with these technical developments.

Thank you.

[The prepared statement of Ms. Watson follows:]

STATEMENT OF

BARBARA L. WATSON

GENERAL MANAGER, TELETEXT

NATIONAL BROADCASTING COMPANY, INC.

I am Barbara Watson. I have been General Manager of NBC Teletext since it was organized in January, 1983. In that capacity, I am the executive with overall responsibility for NBC's national broadcast teletext service.

The Subcommittee has invited us to appear to present our views on the existing and future technological systems for television captioning. While my principal background involves mananagement, marketing and planning, I am familiar with some of the technical aspects of teletext.

Broadcast teletext is a system by which "pages" (really television screens) of text and graphic images are prepared, coded, packaged, cycled and inserted ınto the vertical blanking interval of the video broadcast signal. They then can be received, decoded and viewed at the viewer's television receiver. The "pages" are continually cycled and re-transmitted so that the viewer can access any individual page at his or her discretion with a minimum of delay. The analogy often used to illustrate teletext is that of a slide carousel constantly turning, with the viewer's decoder "grabbing" the desired slide at the push of a button.

With the NABTS standard selected by NBC, CBS, Time Inc. and others, the page is coded into something representing

computer language (PLP) which is transmitted over the air to the decoder. The decoder receives the code and translates it back into the original text and graphic image.

The major technical functions of a teletext system are the creation of the PLP code which makes up the page image; the placement of the page image in the appropriate slot or position in the cycle; the addition of the transmission protocol (as defined in the standard); and the continuous cycling and insertion of the service.

The teletext technology allows the overlay of text on the video image carried on the main channel of the video signal. It is this process which provides the captioning capability.

In a teletext system, the teletext caption is in "real time", and is timed to be associated with the video signal to which it is linked. This is accomplished by pre-empting the teletext cycle and inserting the caption immediately into the vertical blanking interval. The decoder recognizes a caption by a special code (a special "magazine" number) and when captioning is requested by the viewer, the text is overlayed on the video picture.

The closed captioning of programs through use of Line 21 of the vertical blanking interval (VBI) has some similar characteristics. Like the teletext system, the text that forms the caption is packaged separately from the video picture but transmitted as part of the total signal. In both systems, this results in overlaying the text on the video picture much as subtitles appear on many foreign films. Line 21 technology uses a dedicated line in the VBI, while teletext captioning

shares the lines allocated to teletext (currently 14, 15, 16, 17, 18, 20) with the other teletext programming.

The functions included in preparing and broadcasting Line 21 and teletext captions are similar,but require different equipment.

In the Line 21 system that NBC is currently using, captions are originally prepared and stored on a floppy disk by one of the organizations providing this service. Prior to broadcast, the video and time code from an uncaptioned master program videotape are fed into a device called a simple encoder. A floppy disk reader is used to read the captions. The time code on the video triggers the extraction of the caption stored on the floppy disk and the caption data is inserted into Line 21 of the video signal. The video signal is then recorded into another videotape called the closed caption master. It is this tape which is then played at broadcast time.

NBC is experimenting with a system called live encoding which eliminates some of the manual steps involved. Under this method the captions would be prepared by a captioning organization and transmitted via data communication lines to NBC, where they would be inserted in real time into Line 21 of the outgoing network feed.

For teletext captioning, it is possible to use the same process for preparing captions for inclusion within the teletext service as that used for Line 21. The head-end broadcast equipment specified by NBC will include a caption

input in addition to the input required for data of the cyclic teletext service.

Input either coming from a floppy disk or from a data line (as described for live encoding above) would be formatted and inserted without delay into the outgoing video feed, with the caption given priority over the cyclic teletext data.

It is also possible to create a closed captioned master tape containing teletext data, by taping the output of the teletext head-end equipment To accomodate such a teletext closed-caption tape at broadcast time, the teletext head-end equipment requires a third input (called a data bridge input because it is used to extract the teletext data already in the VBI of a video signal). The head-end equipment recognizes and selects the teletext captioning data recorded on the closed-captioned master tape. The captioning data is then time multiplexed with the cyclic teletext service and reinserted into the outgoing video feed without delay. In this way, pre-captioned tapes supplied to NBC can be inserted into the continuous cyclic teletext service.

Line 21 captioning and teletext captioning produce the same result -- transmitting text over the VBI to special equipment attached to the television set which recognizes the data as a caption and overlays it on the television screen.

Teletext captioning, however, uses a different transmission protocol, and shares the VBI lines with other teletext data. Line 21 captioning has its own transmission protocol and uses a

single, dedicated line in the VBI.

Using teletext technology, captioning is a subset of an expansive text and graphics service, utilizing a teletext decoder which can handle captioning as well as other teletext service. The Line 21 adaptor simply provides access to Line 21 captions. The components of each system are similar: a tuner to access the over-the-air signal before it reaches the television; a data-slicer that breaks the VBI portion of an analogue signal into the on-off bits of a digital signal; memory and logic to process the data; and a means to display the data on the television receiver.

The NABTS teletext decoder provides high resolution graphic capability by means of the PLP coding scheme as mentioned above, and, as such, requires a more advanced display processor. The teletext decoder must also handle a higher data rate because of the number of lines handled and because of the volume of data cycled. Teletext decoders also provide memory to buffer pages to improve the viewer's access time.

While I have not been personally involved, NBC has participated in the closed captioning of television programming on Line 21 since it began on a national basis in 1980. NBC recognized from the outset that many operating and logistic problems existed. Nevertheless, NBC, ABC and PBS each purchased at substantial cost the necessary capital equipment to engage in and transmit closed captioning, and arranged with

the National Captioning Institute to purchase "floppy discs", with closed captions. NBC alone transmitted an average of 5 hours per week of captioned programs.

NBC's participation in this project was expressly conditioned on the representation that the hearing impaired public would obtain at least 100,000 decoders or television receivers with decoders a year. Meeting this expectation was ecpressly made of the essence in judging the success of the project.

The cumulative sales, however, have been far from that minimum. After an initial spurt of interest, sales of decoders leveled off to the point that after the first year the public had obtained fewer than 25,000 decoders. The project was clearly disappointing. Almost two years later, fewer than 50,000 decoders had been sold, compared to the expected minimum of 200,000. Today, almost 4 years after the project commenced, we understand there are fewer than 75,000 decoders -- or less than 20% of expected public demand.

Skeptical as we are of the extent of interest by the hearing impaired in closed captioning, NBC continues to transmit on Line 21 closed captioned programs for which captions are supplied by producers, advertisers and other outside sources. Programs presently captioned include "Diff'rent Strokes," "Facts of Life," "Monday Night at the Movies" and "The Shirt Tales," a program in our Saturday

morning children's schedule. Some of NBC's special programs are also captioned, as are reruns of previously captioned shows when that is technically possible.

NBC intends to continue to work with organizations for the hearing impaired and technical organizations to explore any new technology that offers promise. Right now, teletext decoders are not available to the public, and high volume production of all decoders to an extent where they would be economically attractive is not expected until 1985. We are very closely watching development in this new field, and believe that that will permit the necessary experimentation with teletext captioning.

NBC appreciates the interest of this Subcommittee in teletext and closed captioning, and the opportunity you have given us today to acquaint you with these technical developments.

Thank you.

BARBARA L. WATSON

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General Manager
NBC Teletext

Barbara L. Watson was appointed General Manager, NBC Teletext, in January, 1983. She is the executive with overall responsibility for NBC high-resolution national broadcast teletext service, which was launched nationally on May 16, 1983. NBC's teletext service, which employs the North American Broadcast Teletext Specification (NABTS), is broadcast by NBC's five television stations -- WNBC-TV, New York; KNBC-TV, Los Angeles; WMAQ-TV, Chicago; WRC-TV, Washington, D.C.; and WKYC-TV, Cleveland -- and by participating NBC Television Network affiliates.

Watson came to NBC from the management consulting firm of Booz, Allen & Hamilton, where she was responsible for managing client assignments addressing a broad range of marketing, business planning, product management and technology issues.

Prior to joining Booz, Allen & Hamilton, Watson was a systems engineer with IBM, where she was responsible for account development, long-range systems planning, and applications marketing. She joined the IBM data processing division in 1967, and was promoted to advisory systems engineer in 1972.

Watson received her Master of Business Administration degree from the Harvard Business School in 1978. She graduated magna cum laude in 1966 from Marquette University, earning her B.A. in English literature and political science.

Mr. DYMALLY [presiding]. Thank you very much, Ms. Watson.

We move on to Mr. Downey now.

Mr. DOWNEY. Thank you, Mr. Chairman.

I am Peter Downey, senior vice president of the Public Broadcasting Service.

As I'm sure you know, PBS was instrumental in developing the line 21 closed captioning system over a decade ago. Let me use my time this morning to focus on the issues of interest to the committee and rely on my written testimony to convey the history of our participation.

So picking up on page 4: PBS currently provides about 1,000 hours a year of closed caption programing. These programs presently include such programs as our series "American Playhouse," "Frontline," "National Geographic," "Nova," "Mystery," "Great Performances," "Masterpiece Theatre," and recently, or currently, the series "Vietnam: A Television History."

Also, children's programs such as all of "Sesame Street," "Reading Rainbow," "3-2-1 Contact," and even special interest programs such as "Over Easy," and "From Jumpstreet."

Attaining viability for the closed captioning effort has involved the initial development of the technology and the financing of the actual captioning of hundreds of hours of programs on an annual basis.

This effort has been made possible by support from private foundations, corporations, government agencies, and public television stations.

In this connection, it is appropriate to recognize publicly the early and welcome support from the Bureau of Education for the Handicapped of the U.S. Office of Education, the Corporation for Public Broadcasting, the Pew Memorial Trust of Philadelphia, the Gulf Oil Corp., Polaroid, AT&T, Johnson & Johnson, and the Kellogg Corp.

I also have the pleasure to announce this morning, Mr. Chairman, that just yesterday, the Corporation for Public Broadcasting agreed to provide another $200,000 for this current fiscal year, which will be matched by public television stations putting up an equal amount, for the continuation of closed captioning on PBS.

Now, the second ingredient necessary to a viable captioning service is marketplace support as demonstrated, at least in part, by the sale of captioning decoders to hearing-impaired viewers. Unfortunately, as others have mentioned this morning, decoder sales have fallen below expectations. However, in an effort to stimulate broader marketplace interest in purchasing closed captioning decoders, PBS has also developed other line 21 data services, such as the U.S. Department of Agriculture's Farm Market News.

Captioning is a costly undertaking for public television, costly in terms of both capital equipment purchases, and per-hour captioning costs. In times such as these, when Federal support for public television has declined, it has become increasingly difficult for public television to sustain its present efforts.

In addition, private support for captioning has been premised in large part on the growth of the marketplace for decoders. Consequently, the absence of demand for captioning decoders has required public television to make very difficult decisions concerning

the allocation of its limited dollars for the provision of captioning services in view of its obligation to serve the much larger general audience. Nevertheless, PBS remains committed to providing this valuable service and is proud of its record of achievement in service to minority audiences.

PBS is perplexed, however, at the failure of others who have far greater resources than we, to make a similar commitment.

Public television alone does not have the resources to deliver either the audience or the dollars that will sustain the marketplace for a closed captioning system. Such an effort will be sustained only with the full and continued participation of the commercial networks which attract the majority of all television viewers. Therefore, for those in commercial broadcasting who are already a part of this effort, we urge them to continue. For those who are not, we urge them to join.

As to the ability of the so-called, emerging technologies to provide captioning services to the hearing impaired, we offer the following comment: Don't be misled. The critical question is not what technology is used—after all, one data stream is like another for these purposes—but whether the service provided is a viable one. Technologically, closed captions may be provided in a variety of ways.

The fact is that closed captioning services can currently be received only on the line 21 system. Millions of dollars have been invested—tax dollars and private dollars—in that line 21 system. And only line 21 closed captioning decoders are available in the marketplace.

Teletext, on the other hand, is an emerging technology for which there is presently no agreed-upon standard and no demonstrated market. Indeed, if the recent CBS and NBC experiments are any indication, it appears it will be some time until that marketplace develops.

And it is naive to expect, as a practical matter, that closed captioning services can command the kind of marketplace interest necessary to lead the way.

Accordingly, the FCC's decision to reserve line 21 for closed captioning services for a period of 5 years was a wise one, we think. Line 21 closed captioning is a special service designed for a special audience and as such, requires some special treatment to insure service to the hearing impaired—until there is a viable substitute, it should remain that way.

And although PBS can foresee a time when it may make sense to shift captioning to other technologies such as teletext, PBS believes that the time has not yet arrived and, therefore, it would be unwise at present to direct our own limited and over-committed resources to provide a limited audience service using a technology that as yet has no demonstrated general audience appeal.

In the case of captioning, any new technology must grow to accommodate the service; the service cannot be expected to grow toward the technology; and investments made by hearing impaired viewers in line 21 technology should be preserved in any case.

Thank you for the opportunity to speak this morning, Mr. Chairman.

[The prepared statement of Mr. Downey follows:]

HEARING ON "DEVELOPING TECHNOLOGIES FOR TELEVISION CAPTIONING: BENEFITS FOR THE HEARING IMPAIRED"

Statement of the Public Broadcasting Service
Before the House of Representatives
Committee on Science and Technology
Subcommittee on Science, Research and Technology

November 9, 1983

Mr. Chairman and Members of the Subcommittee:

My name is Peter Downey, and I am Senior Vice President of the Public Broadcasting Service (PBS). PBS is a private, nonprofit, membership corporation. Its members are the licensees of noncommercial educational or public television stations located throughout the United States and its territories. PBS provides national program distribution and related acquisition, scheduling, publicity, advertising and promotion services to those stations and is funded primarily by them. Much of the prime time, children's and special interest programming distributed by PBS is made available to hearing impaired audiences through closed captions transmitted in Line 21 of the vertical blanking interval of the television broadcast signal.

PBS is not a newcomer to television captioning. Working closely with the Department of Health, Education and Welfare (HEW), the ABC television network, various organizations for the hearing impaired and others, PBS has been a pioneer in efforts to make television available to the hearing impaired. In 1972, PBS began experimenting under a grant from HEW with a technology that would permit the insertion of captions, or subtitles, into television signals in such a way that the captions would be visible only through the use of a special decoder attached to the

viewer's television set. This technique was perceived as an ideal means of making the aural portion of television programs accessible to the hearing impaired since it permits the deaf to enjoy that portion of the television program without requiring the normal hearing audience to watch potentially distracting captions.

Working under a series of grants and contracts from HEW, PBS completed the technological development of the closed captioning transmission system, and developed the necessary prototype equipment to encode the captions into the television signal and synchronize them with the visual part of the program, and to permit the viewer to decode the signal into visible captions. Because people speak faster than they can read, and because the hearing impaired generally have reduced reading skills, captioning a program requires that the transcript be edited to compress the dialogue into captions which can be read during the period the scene with which they are associated is on the screen. Once that editing process is completed, the captions must be encoded in a computer storage device, then synchronized with the visual part of the program, and finally encoded onto the videotape of the program.

PBS also successfully petitioned the FCC for authority to use Line 21 to transmit the encoded captions as part of the television signal. The "closed captioning" system became operational in late 1979 with the creation of the National

Captioning Institute (NCI), a nonprofit corporation that provides captioning services to PBS, the ABC and NBC television networks, and others. In addition, closed captioning services have been provided by other organizations, including public television station WGBH in Boston.

While closed captioning was maturing, other efforts were made by public television to serve the deaf. With the cooperation of the ABC television network, PBS began in 1973 to add open captions provided by WGBH to the ABC Evening News and to distribute the program to public stations a few hours after original broadcast. By 1979, PBS was distributing to public broadcasters approximately five hours of programming per week with open captions. These included children's series, dramatic and performance programs, documentaries, the ABC Captioned News, and special events, such as the Presidential campaign debates of 1976.

In 1981, PBS's distribution of closed captioned programs grew to some 30 hours per week. In addition, as a result of PBS's initial efforts, both ABC and NBC also agreed to close caption up to five hours each week. The CBS television network has never participated in the closed captioning project.

PBS has continued its captioning efforts. In 1982 and again in 1983 (projected) PBS distributed approximately 1,000 hours of closed captioned programs, not counting locally broadcast repeats

of programs within the same week. The result is that much of PBS's prime time programs (for example, AMERICAN PLAYHOUSE, FRONTLINE, NATIONAL GEOGRAPHIC, NOVA, MYSTERY, GREAT PERFORMANCES, MASTERPIECE THEATRE, AND VIETNAM: A TELEVISION HISTORY), children's programs (for example, SESAME STREET, READING RAINBOW, and 3-2-1 CONTACT), and special interest programs (for example, OVER EASY and FROM JUMPSTREET) are closed captioned for the hearing impaired. Finally, through PBS's joint engineering efforts with the National Captioning Institute, PBS is now able to offer live programs with closed captions provided on a real time basis.

Attaining viability for the closed captioning effort has involved the initial development of the technology and the financing of the actual captioning of hundreds of hours of programming on an annual basis. This effort has been made possible by support from private foundations, corporations, government agencies, and public television stations. In this connection, we would particularly like to recognize publicly the early and welcome support from the Bureau of Education for the Handicapped of the United States Office of Education, the Corporation for Public Broadcasting, the Pew Memorial Trust of Philadelphia, the Gulf Oil Corporation, Polaroid Corporation, AT&T, Johnson & Johnson, and the Kellogg Corporation.

The second ingredient necessary to a viable captioning service is marketplace support, as demonstrated, in part, by the sale of captioning decoders to hearing impaired viewers. Unfortunately, decoder sales have fallen below expectations. In an effort to stimulate broader marketplace interest in purchasing closed captioning decoders, however, PBS also has developed Line 21 data services such as the United States Department of Agriculture's "Farm Market News."

Captioning is a costly undertaking for public television; costly in terms of both the capital equipment purchases and per hour captioning costs. In times such as these when federal support for public television has declined, it has become increasingly difficult for public television to sustain its present efforts. In addition, private support for captioning has been premised in large part on the growth of the marketplace for decoders. Consequently, the absence of demand for captioning decoders has required public television to make difficult decisions concerning the allocation of its limited dollars for the provision of captioning services in view of its obligation to serve the much larger general audience. Nevertheless, PBS remains committed to providing this valuable service and is proud of its record of achievement and service to minority audiences.

PBS is perplexed, however, at the failure of others, who have far greater resources than we, to make a similar commitment.

Public television alone does not have the resources to deliver either the audience or the dollars that will sustain the marketplace for closed captioning services. Such an effort will be sustained only with the full and continued participation of the commercial networks which attract the majority of all television viewers. Therefore, for those in commercial broadcasting who are already a part of this effort, we urge them to continue; for those who are not, we urge them to join.

As to the ability of the so-called emerging technologies to provide captioning services to the hearing impaired, we offer the following comment: Don't be misled. The critical question is not what technology is used (One data stream is like another for captioning purposes.) but whether the service provided is viable. Technologically, closed captions may be provided in a variety of ways; but the fact is that closed captioning services can currently be received only on the Line 21 system. Millions of dollars have been invested in the Line 21 system, and only Line 21 closed captioning decoders are available in the marketplace. Teletext, on the other hand, is an emerging technology for which there is presently no agreed-upon standard and no market. Indeed, if the recent CBS and NBC experiences are any indication, it appears it will be some time until that marketplace develops. And, it is naive to expect, as a practical matter, that closed captioning services can command the kind of marketplace interest necessary to lead the way.

Accordingly, the FCC's decision to reserve Line 21 for closed captioning services for a period of five years was a wise one. Line 21 closed captioning is a special service designed for a special audience and as such, requires special treatment to ensure service to the hearing impaired. Until there is a viable substitute, it should remain that way. Although PBS can foresee a time when it may make sense to shift captioning to other technologies such as teletext, PBS believes that time has not yet arrived and therefore that it would be unwise at present to direct its own limited and overcommitted resources to provide a limited audience service using a technology that as yet has no demonstrated general audience appeal. In the case of captioning, any new technology must grow to accommodate the service; the service cannot be expected to grow toward the technology; and investments made by hearing impaired viewers in Line 21 technology should be preserved in any case.

We appreciate this opportunity to speak before the Subcommittee on Science, Research and Technology of the House Committee on Science and Technology. I will be delighted to answer any questions or provide any additional information you may want.

Mr. DYMALLY. Thank you very much.

We will go on now to Mr. Maskin.

Mr. MASKIN. Mr. Chairman and members of the subcommittee, my name is Leonard Maskin. I am vice president, ABC Broadcast Group. ABC is pleased to have this opportunity to appear before you.

With me today is Richard Stubbe, director of television network operations, ABC's department of broadcast operations and engineering.

Although I have been involved from the beginning in ABC's efforts to make television more meaningful to the hearing impaired, Mr. Stubbe is better equipped than I to respond to any questions you may have of a technical nature.

ABC is proud of the role it has played in closed captioning programs for the hearing-impaired viewers. The recent renewal of our agreement with the National Captioning Institute and our recent increase in the amount of closed captioned programs we are now providing are further demonstrations of our support for this important project.

ABC first began televising closed captioned programing in March 1980, making this 1983–84 season the fourth year in which we have presented this service to hearing impaired viewers.

ABC's involvement with and interest in this unique undertaking actually started in 1971 following a speech by Leonard H. Goldenson, chairman of the board, American Broadcasting Cos., Inc.

Mr. Goldenson called for greater use of technology in general to help the handicapped, and this sparked the company's effort to find a method of captioning television programs for the hearing impaired.

Let me briefly detail ABC's role among the broadcasting community in the development of the closed captioning system:

In October 1971, the National Bureau of Standards asked ABC to participate in an experiment to present standard time and frequency signals over the air.

While researching this, Julius Barnathan, now president of Broadcast Operations and Engineering for ABC, and his staff determined that they could insert closed captions on the television screen.

December 1971, at the first National Conference on Television for the Hearing Impaired in Knoxville, Tenn., a demonstration of the feasibility of closed circuiting—of closed captioning was presented by ABC.

December 1971, Clay T. Whitehead, then Director of the White House Office of Telecommunications Policy, wrote to Mr. Barnathan suggesting that the demonstration at the conference for the hearing impaired, and I quote, "could be a real breakthrough from the standpoint of deaf people and their families."

January 1972, the National Association of Broadcasters selected Mr. Barnathan to be chairman of a special subcommittee to develop standards for a television captioning system for the deaf.

February 15, 1972, ABC and the National Bureau of Standards presented the first on-air demonstration of a completely closed captioned television program at Gallaudet College in Washington, D.C. through the normal broadcast of the ABC program Mod Squad.

Captions were inserted through the facilities of ABC's Washington affiliated station. This demonstration at Gallaudet, the most prominent college in the country for educating the deaf, met with enormous response.

Starting in 1972, PBS, under a contract with HEW's Bureau of Education for the Handicapped, refined and tested the system.

In 1974, under special temporary authority from the Federal Communications Commission, PBS began actual broadcast tests. The FCC granted approval for broadcasters to present captioned material in December 1976.

President Carter wrote to ABC, CBS, and NBC in February 1977, requesting suggestions about the viability and practical application of a closed captioning system.

Frederick S. Pierce, now president of American Broadcasting Cos., Inc., responded to President Carter and offered encouragement and optimism about implementing such a system.

He urged a conference of a cross-section of industry leaders to help resolve the then existing problems. Copies of President Carter's letter of February 18, 1977 and of Mr. Pierce's reply of March 4, 1977 are attached to my statement.

Shortly thereafter, development of the decoding equipment began. The formal announcement of the closed captioning venture was made in Washington in March 1979 by HEW Secretary Joseph Califano.

In announcing this industry-wide program and the agreement reached by ABC, NBC, and PBS with the National Captioning Institute, Mr. Pierce remarked, and I quote:

> This achievement is encouraging for many reasons. It has come about through cooperation of government, private industry, and nonprofit organizations. It represents evidence of an increased national interest in helping handicapped Americans participate more fully in society. For us, it culminates years of commitment and concern.

A copy of Mr. Pierce's remarks of March 23, 1979 is also attached to my statement.

Our current agreement with NCI is for it to provide closed captioning for 5½ hours of programing per week in prime time. However, our actual closed captioning service is in fact much greater. Not only do we close caption in excess of 8 hours of ABC television network prime time programing a week but we are currently closed captioning many sports, news, and children's programs as well as a wide variety of motion pictures and special event programing.

In addition to closed captioned programs, we also offer a news headline service to those viewers who have the capability to receive closed captions.

I would particularly emphasize that World News Tonight, our half-hour evening news program, is closed captioned on a real-time basis, making this the only regularly scheduled newscast to be so captioned.

Also, ABC News' live coverage of President Reagan's Inauguration ceremonies in January 1981 was the first time closed captions were used in a live telecast.

The projected cost of ABC's contribution for 1983 alone toward this project exceeds $900,000. ABC's total contribution for the last 4 years exceeds $3.4 million.

We applaud NCI's efforts in having obtained substantial funding from both the television production and advertising communities, which has made possible the closed captioning of various programs and commercials.

Our current information from NCI is that in excess of 70,000 stand-alone decoders and decoder-equipped receivers have been sold, representing an estimated 300,000 viewers.

Despite the tremendous technological strides that have been made and despite the current stand-alone decoder price of $250 to $280, which is generally considered reasonable, we are puzzled why more of the hearing impaired have not become active participants.

When President Carter wrote to Mr. Pierce in February 1977, he said that, and I quote, "94 percent of the deaf persons interviewed in a nationwide poll indicated that they would purchase a home decoder if closed captioning were available in their areas."

Assuming the widely used statistic of 2 million deaf and another 14 million hearing impaired Americans, clearly expectations for decoder sales have not been realized.

Although ABC has continued to receive nationwide recognition for its social responsiveness in helping to continue and expand this innovative closed captioning service, we continue to review our participation in this project periodically, as we have from the beginning.

ABC has made its good faith toward making television more accessible to the hearing impaired.

We are disappointed that, after more than 3 years of closed captioning being available on network programing, there is not a greater number of hearing-impaired who benefit from this service.

We can only hope that with expanded support from fellow broadcasters and various other interests involved in this most worthwhile undertaking both private and governmental, this service will progress to be the exciting and successful endeavor that we all know is possible, thereby enriching the lives of many added millions of Americans.

This past September, on the occasion of announcing our renewed agreement with NCI for closed captioning service, ABC prepared a brief videotape which demonstrates the variety of our efforts in the closed captioning area. At this time we would like to share it with you.

Thank you.

[The prepared statement of Mr. Maskin follows:]

STATEMENT OF

LEONARD E. MASKIN

VICE PRESIDENT, ABC BROADCAST GROUP

AMERICAN BROADCASTING COMPANIES, INC.

Mr. Chairman and Members of the Subcommittee:

My name is Leonard E. Maskin. I am Vice President, ABC Broadcast Group. ABC is pleased to have this opportunity to appear before you.

With me today is Richard Stubbe, Director of Television Network Operations, ABC's Department of Broadcast Operations and Engineering. Although I have been involved from the beginning in ABC's efforts to make television more meaningful to the hearing impaired, Mr. Stubbe is better equipped than I to respond to any questions you may have of a technical nature.

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impaired viewers. ABC's involvement with and interest in this unique undertaking actually started in 1971 following a speech by Leonard H. Goldenson, Chairman of the Board, American Broadcasting Companies, Inc. Mr. Goldenson called for greater use of technology in general to help the handicapped, and this sparked the company's effort to find a method of captioning television programs for the hearing impaired.

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from the Federal Communications Commission, PBS began actual broadcast tests. The FCC granted approval for broadcasters to present captioned material in December, 1976.

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> private industry and non-profit organizations. It represents evidence of an increased national interest in helping handicapped Americans participate more fully in society. For us, it culminates years of commitment and concern."

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THE WHITE HOUSE

WASHINGTON

February 18, 1977

To Mr. Frederick Pierce

As you know, there are many Americans who suffer from serious hearing impairments. At present, these people are unable to benefit from television, one of the major sources of information available to the rest of us.

I understand that some experiments with closed captioning, partially funded by HEW and PBS, have been successful in twelve national test sites. Ninety-four percent of the deaf persons interviewed in a nationwide poll indicated that they would purchase a home decoder if closed captioning were available in their areas. Additionally, some stations have broadcast selected programs using sign language.

Your suggestions about these and other practical means of helping our deaf citizens would be appreciated.

Sincerely,

Jimmy Carter

Mr. Frederick Pierce
President
American Broadcasting Company, Inc.
1330 Avenue of the Americas
New York, New York 10019

ABC Television 1330 Avenue of the Americas New York, New York 10019 Telephone 212 LT1-7777

Frederick S. Pierce
President

March 4, 1977

The President
The White House
Washington, D.C. 20500

Dear Mr. President:

Thank you for your February 18, 1977 letter requesting ABC's views with respect to the "captioning" of television programming to aid the hearing impaired.

ABC has long been in the forefront of efforts to enhance the value of television to the hearing impaired and those with other handicaps; and we remain committed to such a leadership role in the future. Consequently, ABC supports the prompt development of a reliable and flexible program captioning system which can be implemented at reasonable cost. However, there remain substantial obstacles to the early achievement of this goal.

Since the FCC revised its rules to permit the insertion of program captioning data in the vertical interval, ABC has devoted considerable effort to specific identification of the problems which remain to be solved before commercial television can provide program captioning on a broad scale. The following are representative:

a) A way must be developed to mass-produce a decoder at a reasonable cost.

b) More precise information must be developed with respect to the cost of including a device in new television receivers which can decode the program captioning data transmitted in the vertical interval.

c) Sophisticated, independent market research is needed to determine realistically the market potential for both "built-in" and "add-on" decoders, since this will bear directly upon cost, delivery schedules, etc.

d) Receiver manufacturers need to determine and advise interested parties of the "lead-time" they need to introduce decoding equipment once its technical configuration is finalized.

e) The cost and technical feasibility of "add-on" decoding equipment for existing receivers must be clarified.

f) A means must be found to make program captioning compatible with film, without having to transfer to video tape.

g) Because program captions include fewer words than spoken dialogue, uncertainty now exists as to the nature and extent of copyright problems which may result from editing scripts for captioning. This is a particular problem since television networks are typically only licensed to use programs; they do not own them.

An important corollary question is what level of skill and training labor unions will insist upon for those involved in the writing and encoding of captions. This question has substantial implications with respect to the cost of captioning. For example, if only script writers were permitted to be involved in preparing the texts of captions, the cost would be much greater than if lesser skilled personnel are extensively employed to accomplish the less demanding portions of this work.

h) Steps should be taken to assure that the encoding of captions is accomplished in the most efficient and cost-effective manner possible. This will likely require the establishment of a limited number of cooperative or joint-venture type encoding centers. At least initially, federal encouragement and financial support may be necessary to the establishment of these centers.

i) There are a number of specific questions with respect to the technical feasibility of the PBS system which need to be resolved through extensive field testing. Some of the more important of these were identified in ABC's May 10, 1976 comments in FCC Docket No. 20693 and additional questions are almost certain to emerge as research continues.

ABC is optimistic that substantial progress can be made toward the prompt, orderly implementation of program captioning on a technically and financially sound basis. However, we believe all concerned should approach this objective with due regard for the significant problems that remain to be resolved. At this moment, there is no proven, financially feasible system for commercial television broadcasters to caption programs on a regular basis for transmission to the homes of the hearing-impaired. While there is substantial reason to hope that captioning will eventually prove feasible, the hearing impaired should not be misled into thinking that closed captioning to the home is presently possible.

It is apparent that the problems enumerated above involve or affect a number of different industries and interests. It is equally apparent that these

diverse interests will have to join forces to develop a technically, operationally and economically viable approach to program captioning. Consequently, we believe the first priority at this time is for some authority such as the federal government to bring the involved and affected interests together in order to assure that the objective of program captioning is pursued in a coordinated manner that will produce viable solutions to the many problems involved at the earliest feasible date.

More specifically, we respectfully suggest that a senior official of the federal government -- perhaps the Secretary of Health, Education and Welfare, or his representative — convene a conference of leaders from the National Association of Broadcasters, the Electronic Industries Association, PBS, the television networks, the television program production industry, film manufacturers and processors, manufacturers of television broadcast equipment and television receiver manufacturers, labor unions representing technical and creative employees in the television and program production industries, copyright holders and other directly affected interests. With adequate advance preparation, a very limited number of meetings of officials from such groups could set in motion the efforts needed to resolve the present questions and uncertainties and, if feasible, to implement program captioning on a regular basis at an early date. ABC would be pleased to cooperate in the development of such a conference. We, of course, also stand ready to participate in the work-effort that would result therefrom.

In the meantime ABC will continue to make available the ABC Evening News series to the Public Broadcasting Service for open captioning and telecast by the PBS stations.

Thank you for seeking our views in this important area.

Sincerely,

Fred W. Pierce

March 23, 1979

AMERICAN BROADCASTING COMPANY

Remarks By
Frederick S. Pierce
President, ABC Television

We at ABC are proud to be part of this alliance, which has produced this breakthrough for the hearing impaired. The term is closed captioning, but the intent is to open up television for a special audience. This achievement is encouraging for many reasons. It has come through cooperation of government, private industry, and non-profit organizations. It represents evidence of an increasing national interest in helping handicapped Americans participate more fully in society. For us, it culminates years of commitment and concern.

ABC is especially excited to be here today, because our initial involvement began with a 1971 speech by our chairman, Leonard Goldenson. His call for use of technology to help the handicapped led to the work of Len Maskin and Julie Barnathan in spearheading the search for solutions. Julie's technical expertise and dedication is a source of special pride. Those of us here today are really representatives of many others whose energy and ideas brought the project to this point. No doubt, their best recognition is in knowing what their work means for the hearing impaired.

This is an occasion of celebration and a powerful reminder of how problems can be solved through teamwork and dedication. To know that television will now become more accessible to the hearing impaired is most encouraging. At ABC, we think this medium enhances and expands the world of all viewers, and we share your enthusiasm in launching this service to bring this medium to a very special audience.

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LEONARD E. MASKIN

Leonard E. Maskin was named Vice President, ABC Broadcast Group, in June 1983. The Broadcast Group is responsible for all television, radio, and motion picture activities of American Broadcasting Companies, Inc. Previously, he was Vice President, Administration, Office of the Executive Vice President, ABC, Inc. Before that, he had been Vice President, Administration for ABC Television since May, 1973 and Vice President, Administration for the ABC Television Network since July, 1970.

Mr. Maskin joined the company as a member of the ABC Television Network's Production Services Department in April, 1952, and subsequently held various positions in the department, including Manager of TV Production Services.

In December, 1962, Mr. Maskin was named Administrative Manager of Television Network Programming. He was promoted to Director of Program Administration in October, 1966.

Mr. Maskin was elected Vice President of ABC in March, 1968, and was named Vice President, Administration, for the Television Network two years later.

A native of Rahway, New Jersey, Mr. Maskin was graduated from New York University with a B.A. in Economics in 1951. During World War II, Mr. Maskin served with the Army Air Corps in the North Atlantic. He married the former Emily Melo of New York City in 1956. The Maskins have three daughters and are residents of Jamaica Estates, New York.

Mr. DYMALLY. Proceed.

[Videotape demonstration.]

Mr. DYMALLY. Thank you very much.

I want to start off with a question to Mr. Flaherty.

Do we see in the different system that CBS is developing a case of Betamax and VHS where the consumer, in order to enjoy ABC and NBC one evening and then switch over to a CBS program, they have to buy two technologies?

Mr. FLAHERTY. Mr. Chairman, no, that—that isn't the case. In fact, the NBC and CBS system are the same. It is one of the systems not primarily developed by CBS but by—originally by European broadcasting companies and adapted to the U.S. environment. That system is the same and the same one being used in Canada. It is compatible with home computer terminals and the wire videotex terminals, the two-way interactive system. So it is a common compatible system.

There is another teletext standard, however, that has nothing to do with line 21. And in that case you could have the Betamax/VHS situation.

Now, I must say, quite candidly, that that is the direct result of the present regulatory environment of marketplace determination of standards. Most of the nations of the world, including Canada, have in fact chosen the teletext standard and the FCC opted to leave that choice to the marketplace in the United States. And such a choice—the merits of it notwithstanding—does in fact cause some initial confusion and usually delay at the introduction of that technology.

Mr. DYMALLY. You came under some slight criticism from the two members. Do you want to respond to that?

Mr. FLAHERTY. Yes, sir. I must say I certainly understand their concern, and I absolutely understand the confusion about the cost of decoders and there may be something I can do to shed some light on that issue.

First of all, the decoders used for professional applications in control rooms and television control centers are the decoders that cost about $3,000. And like most professional equipment, they will always be very high priced. Most professional equipment in the studios is several times more expensive than what is normally in the consumer market. So the high price, the $3,000 decoders, are the professional ones—not intended for the home.

The price of $1,000 decoders is the cost of what are called discrete component decoders. Those are the early prototypes in the design cycle in any new technology that are developed to prove that—the technology, to develop the features, to field test the unit, and so on. And they are virtually handmade in small quantities and they are always expensive.

Now, in fact, there is such a decoder that Bob has here that the prototype built by Panasonic for this NABTS system, and that is in fact the type of decoder that presently costs about $1,000.

Naturally, that is not the final solution—that is an interim prototype.

The cost of the mass-produced decoders that I referred to in the range of $150 built into the set, depends on the development of these very large-scale integrated chips. Now, to simplify the tech-

nology a bit, that's the same sort of chip you find in pocket calculators and digital watches, and so on.

And if you remember just a few years ago, perhaps 6 or 7 years ago, those pocket calculators cost $200 or $300 to simply do addition, subtraction, multiplication, division. Today, calculators doing that same job can be purchased for $10 or $12. That has to do exlusively with the mass production of these very large-scale integrated circuits.

And where we are today in teletext, is that those circuits—some are available, some are still under development, some are standard units such as microprocessors that are already in widespread consumer use.

So we are about half to two-thirds of the way through this development cycle, which is what led me to estimate that we are probably 18 to 24 months from the achievement of this mass device. So those confused prices, I am certain, are confusing to everybody, and I hope that sheds some light on that.

If I could address the—a couple of other issues there that were mentioned this morning. One is that the success of captioning elsewhere in the world has all been achieved through the use of teletext systems. This country is the only one which is using a dedicated system such as our line 21 system. So I think it is quite appropriate to characterize our present situation as that awkward time between the phasing out of a short-term technology and the introduction of the long-term technology. We are suffering now, both the costs and the frustrations, of a dual system during this changeover period.

That, I think, is what is bringing so much concern, particularly to the hearing-impaired community.

I must say that I cannot, in good conscience, condemn CBS for taking the long-term approach. We have in fact pioneered this teletext operation in this country; conducted most of the in-depth technical tests in the field; tests in practical broadcasting. And today, we are doing all that a broadcaster can do. We are broadcasting the magazine throughout the Nation and selected captioning programs in teletext on our network. That is all we can do.

I am sure you will appreciate that we don't have any direct influence on what features receiver companies in their hard good consumer field will add to their new television sets. They, too, are caught up in a technological explosion demanding the redesign of sets for digital processing, for improvements, stereophonic sound, and so on. And they have to make individually their own decisions about how and when they will add teletext to their line.

I must say that that has certainly been delayed by the lack of a standard in the United States. And it has been delayed in the normal design procedure of designing the very large-scale integrated circuits.

But we, at CBS, continue to transmit the teletext magazine and teletext captions to encourage these receivermakers to go ahead with design of decoders which is, after all, all a broadcaster can do.

Mr. DYMALLY. One final question for the rest of the panel.

You express some disappointment in terms of users of the system. Does that mean that you are going to—no, I should put it the other way. Are you going to lose any enthusiasm to continue to

make this available or are you going to suffer disappointment until the public catches up with you?

Mr. MASKIN. I assume the question is directed to ABC.

Mr. DYMALLY. I think NBC, too, because you expressed some disappointment that the estimate fell short.

Mr. MASKIN. The answer is that we do not have any present intention of cutting back on our service.

Mr. DYMALLY. OK. Ms. Watson.

Ms. WATSON. At NBC we are continuing to broadcast on line 21 captioning. And we are very hopeful that the teletext technology will expand the interest of the hearing impaired in an expanded service.

Mr. DYMALLY. Mr. Downey, you would hope that Congress would give you a little more money, wouldn't you?

Mr. DOWNEY. Yes, sir.

Mr. DYMALLY. Thank you very much. We will move to the next panel. OK, thank you so much for coming.

Let's move to our next panel of manufacturers.

The second panel is here but we are going to run out of time if we don't expedite the testimony; so if you can summarize, your entire statement will be placed in the record. We have to vacate the room sometime after lunch today. So, Mr. Harper.

STATEMENTS OF GREGORY W. HARPER, VICE PRESIDENT, MARKETING AND PRODUCT DEFINITION, VIDEO GRAPHIC SYSTEMS OF AMERICA, NEW YORK, N.Y.; EARL HARRINGTON, DIRECTOR, TELEVISION PRODUCT PLANNING, ZENITH RADIO CORP., GLENVIEW, ILL., AND EDWARD A. MURPHY, PRESIDENT, EEG ENTERPRISES, INC., FARMINGDALE, N.Y., ACCOMPANIED BY MRS. MURPHY, NURSE

Mr. HARPER. I thank you, Mr. Chairman. My name is Gregory W. Harper, and I am vice president of marketing and product definition for VSA—Videographic Systems of America.

On behalf of VSA, I would like to thank you for this opportunity to appear before this committee.

VSA is a U.S. company owned by a consortium of French high-technology companies, including the $5.5 billion a year consumer and professional electronics giant, Thomson CSF.

VSA has its roots in another U.S. company, Antiope and Telematics Corp., which actively participated in the development of teletext in the United States.

VSA and its predecessors have been in the teletext business in the United States for over 5 years. And I have been part of that effort for the full 5 years and served as president of Antiope.

After 5 years of testing and field trials, I am happy to report that teletext is finally out of the lab and well on its way to becoming a consumer item. Already today we have NABTS teletext being broadcast by CBS and NBC on a national basis, and local broadcasters are gearing up to provide locally originated magazines.

The VSA supports NABTS teletext because VSA thinks it's the best solution in today's market and it has the requisite expansion capability for years to come.

Since NABTS is based on the variable format technology and is designed around the microprocessor it has been designed to be independent of the type of terminal in use. This is very important in this age of rapidly changing technology.

This means that a page of information created today on the NABTS system will be decodable on a decoder built many years from now, even if that decoder is far more sophisticated with features that we have not yet dreamed of today.

In the area of captioning for the hearing impaired, a very important element of teletext, we developed the first variable format captioning system for CBS and WGBH. In the past year we have modified that system to work in the NABTS standard.

We are firmly behind teletext as a captioning tool and we strongly feel that the development of teletext in the United States will be extremely beneficial to the hearing impaired.

With teletext, the hearing-impaired community will no longer have to buy an expensive dedicated decoder that only provides captioning and limited scrolling text displays.

The line 21 decoder is a unit that is sold only to the hearing-impaired viewers, and will never benefit from the true mass production—and, therefore, cost reductions—other consumer products enjoy. Captioning with teletext, on the other hand, has the potential to be a mass consumer item.

The logic is rather simple, when one considers the cost of building millions of units—not thousands. It is very possible that it will be cheaper for the manufacturer to add the teletext chips directly to the basic TV set chassis, instead of building a separate teletext decoder.

Once this is done, the teletext circuitry can be used for other functions, such as channel display on the screen, or to provide remote control and other functions as automatic fine tuning.

The addition of teletext to a TV set in a few years could, in fact, become a minor cost increase similar to the cost increase of putting in a UHF tuner.

The argument for captioning with teletext is very strong. Not only will the hearing-impaired community benefit from the cost reductions in mass produced items, but it will also get, for the same price, basic teletext service.

Teletext, with instant updating capabilities, as you saw earlier today, and colorful graphics, is a useful service that gives the viewer news when he or she wants it, 24 hours a day.

Unlike other text mediums which offer only scrolling messages that take up to 20 minutes per cycle, teletext is there when you want it. With the keypad one can select exactly what news or information one wants, and in a matter of seconds it is available on the screen.

With teletext the viewer controls what he wants and gets it fast, in color, with graphics, all for free, of course, if he has a decoder.

But NABTS teletext does not stop there. NABTS teletext is fully compatible with NAPLPS videotex. Videotex is a two-way text and graphic system that uses the home TV set and telephone to connect the user to an information provider.

With the addition of a low-cost modem, the owner of a teletext decoder will not only get captioning and news, but when connected

to a remote data base like Viewtron service just launched in Florida by Knight Ridder, will be able to do shopping and banking at home.

Buying a teletext decoder, then, is not a narrow purchase of a device just for captioning, but is, rather, part of a whole home information system that can do many more things than provide black and white captions. Because NABTS teletext is asynchronous it can be used with existing home computers. With the addition of an interface board and software, a home computer would be able to receive and display teletext and videotex messages.

Line 21 captioning in itself is not a bad technology ; in fact, when it was first introduced in the midseventies, it was a remarkable achievement. But technology has progressed rapidly since then and the line 21 service has been overtaken by that rapid advance.

Line 21 decoders were designed before the era of low-cost microcomputers. When these little microcomputers on a chip hit the market the electronics industry was fundamentally changed. It has been likened by some as the same change that occurred when the transistor replaced tubes. Overnight, all the tube based equipment became obsolete.

I am afraid the same may have happened with the line 21 decoders; they just missed the microprocessor evolution.

I can remember 1975 when the state of the art in video games was a game called pong. Today, you cannot give a pong set away. Today's games, all using microcomputers, boast multiple colors, realistic sound, and animated graphics.

The difference between the line 21 decoders and teletext is roughly the same. On one hand you have a device that has limited functionality, captioning and scrolling text. On the other hand, you have a system that can do captioning and data base retrieval, home shopping, home banking and game playing, all in color, with high resolution graphics.

The only problem is that today, line 21 decoders are in the marketplace and, because of the newness of the teletext technology, relatively fewer teletext decoders have been introduced.

That is true today, but will not be true in a few years. Already, prototype decoders have been shown by major consumer electronics companies, including ourselves.

While I am not prepared to give you a specific date when the VSA will introduce its latest decoder into the U.S. market—our competition would love to know that and we believe in competition. I can tell you today about a related development that will have an impact in our activities in the United States.

Our developments in the captioning arena have been helped tremendously by the activity our parent companies are undertaking in France. Although some may ask what activities in France have to do with captioning in the United States, I would like to take a minute and show why it may be very important.

As I mentioned earlier, NABTS, the standard endorsed by CBS and NBC and many other major manufacturers, was developed by taking the best features from three systems and adding whatever was needed to make the product the best for the U.S. market.

One of the three systems was the French Antiope Didon technology. After the creation of NABTS, France endorsed a subset of

NABTS as its national standard. In fact, the only major difference between the subset being used in France and the subset used for captioning is the high resolution graphics which some say are not immediately required for captioning .

The French standard includes all of the multiple language captioning capabilities of NABTS as well as the use of colors for captioning.

The commonality of the two standards means that the technological base on which French decoders are built is similar to that which would be required in the United States.

This becomes very interesting when one looks at the commitment the French Government has made toward the hearing impaired. In all industries that depend on two or more groups working together there is the traditional problem of synchronizing development.

In other words, it serves no end if you produce television pictures in color and there are no color sets to receive them. This phenomenon has been called the chicken and egg syndrome.

France is no different, and even though French channel 2 is now captioning with teletext 2 hours of programming per week, soon to be increased to 4, without substantial numbers of decoders to receive the captions it is an effort appreciated by very few.

To solve this, the French Broadcasting Authority has placed an initial order for 30,000 teletext decoders, deliverable in the beginning of next year. Thomson, our major shareholder, has received that order and has commenced mass production of decoders which will sell in France for 1,200 French francs, or at the present rate of exchange, $150, factory cost.

Decoders manufactured using this technology will be available for the U.S. market either through direct French production—in France or the United States—or through license of the French technology to U.S. manufacturers.

In closing, I would like to reaffirm my company's support for teletext and teletext captioning. We feel we are at the start of a promising era in a new market. The first consumer teletext decoders have just started appearing, or will appear in 1984. We are all looking forward to this new consumer electronics product.

Thank you very much, Mr. Chairman.

[The prepared statement of Mr. Harper follows:]

BEFORE THE UNITED STATES
HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE AND TECHNOLOGY
Statement of Gregory W. Harper

My name is Gregory W. Harper and I am Vice President for marketing and product definition for VSA - Videographic Systems of America. VSA is a US company incorporated in 1981 to manufacture and sell teletext and videotex equipment for the US market. VSA is owned by a consortium of French high technology companies, including the 5.5 billion dollar a year consumer and professional electronics giant, Thomson CSF. VSA has its roots in another U.S. company, Antiope and Telematics Corp., which actively participated in the development of teletext in the United States. VSA and its predecessor have been in the teletext business in the United States for over five years. I have been part of the effort for the full five years and served as President of Antiope and Telematics.

After five years during which all of the potential entrants developed prototype equipment, and wrote standards to conform to the specific needs of the U.S. market, I am happy to report that teletext is finally out of the lab and well on its way to becoming a consumer item. Already today we have NABTS* teletext being broadcast by CBS and NBC on a

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* North American Broadcast Teletext Specification.

national basis, and local broadcasters are gearing up to provide locally originated magazines. Numerous companies have announced plans and have shcwn prototype commercial decoders to receive these broadcasts. Our company has been instrumental in developing teletext and we are firmly committed to continue that commitment in the years to come. We are pleased that our technology and equipment is being used today by CBS and NBC to produce and decode their national teletext magazines. We helped develop the standard that is rapidly becoming the U.S. de facto standard, NABTS. I had the privilege of being one of the members of the committee that took the French Antiope, Canadian Telidon and ATT standards and developed a truly American standard answering the particular needs of the American marketplace. In close cooperation with the networks, our company and its predecessors have always been in the forefront of this technology and we intend to stay there.

VSA supports NABTS teletext because VSA thinks it is the best solution in today's market and that it has the requisite expansion capability for years to come. NABTS is not just a teletext technology but rather a protocol that allows sophisticated communications between two devices. In the broadcast mode NABTS is a data broadcasting system that allows a broadcaster to make use of his vertical blanking interval ("VBI"), the unused portion of the TV signal located

at the top of the picture, to send digital information. The information may be coded to be interpreted by a low cost decoder producing text and graphics on the home TV screen or it may be computer data destined for a personal computer.

Since NABTS is based on the variable format technology and is designed around the microprocessor it has been designed to be independent of the type of terminal in use today. This is very important in this age of rapidly changing technology. This means that a page of information created today on the NABTS system will be decodable on a decoder built many years from now, even if that decoder is far more sophisticated with features we have not even dreamed of today. The expansion capability of NABTS does not stop with the display codes. Multiple addressing of information is available. Thus it is possible to create pages of text in multiple languages and broadcast them simultaneously. This technique, known as multiplexing, allows a single TV channel to be used not only for the regular TV signal but also for multiple levels of data transmission. Multi-language captioning is one of those levels.

In the area of captioning for the hearing impaired, a very important element of teletext, we developed the first variable format captioning system for CBS and WGBH (Boston). In the past year have modified that system to work in the NABTS standard. We are firmly behind teletext as a captioning

tool and we strongly feel that the development of teletext in the United States will be extremely beneficial to the hearing impaired.

With teletext, the hearing impaired community will no longer have to buy an expensive decoder that only provides captioning and limited scrolling text displays. The Line 21 decoder is a unit that is sold only to hearing impaired viewers, and will never benefit from the true mass production (and therefore cost reductions) other consumer products enjoy. Captioning with teletext, on the other hand, has the potential to be a mass consumer item.

The logic is rather simple, when one considers the cost of building millions of units. It is very possible that it will be cheaper for manufacturers to add the teletext chips directly to the basic TV set chassis, instead of building a separate teletext decoder. Once this is done, the teletext circuitry can be used for other functions, such as channel display on the screen, or to provide remote control and other functions such as automatic fine tuning, etc. The addition of teletext to a TV set in a few years could, in fact, become a minor cost increase, similar to the cost increase of putting in a UHF tuner.

The argument for captioning with teletext is very strong. Not only will the hearing impaired community benefit from the cost reductions in mass produced items, but it will also

get, for the same price, basic teletext service. Teletext, with its instant updating capabililty and colorful graphics, is a useful service that gives the viewer news when he or she wants it 24 hours a day. Unlike other text mediums which offer only scrolling messages that take up to 20 minutes per cycle, teletext is there when you want it. With the keypad one can select exactly what news or information one wants, and in a matter of seconds it is available on the screen. With teletext the viewer controls what he wants and gets it fast, in color, with graphics, all for free, if he has a decoder.

NABTS teletext does not stop there. NABTS teletext is fully compatible with NAPLPS videotex. Videotex is a two-way text and graphics system that uses the home TV set and telephone to connect the user to an information provider. With the addition of a low cost modem, the owner of a teletext decoder will not only get captioning and news, but when connected to a remote data base like the Viewtron service just launched in Florida by Knight Ridder, will be able to do shopping and banking at home. Buying a teletext decoder then is not a narrow purchase of a device just for captioning, but is rather part of a whole home information system that can do many more things than provide black and white captions. Because NABTS teletext is asynchronous it can be used with existing home computers. With the

addition of an interface board and sofware, a home computer would be able to receive and display teletext and videotex messages.

Line 21 captioning in itself is not a bad technology; in fact, when it was first introduced in the mid-70's it was a remarkable achievement. But technology has progressed rapidly since then and the Line 21 service has been overtaken by that rapid advance. Line 21 decoders were designed before the era of low cost microcomputers. When these little computers on a chip hit the market the electronics industry was fundamentally changed. It has been likened by some as the same change that occurred when the transistors replaced tubes. Overnight all the tube based equipment became obsolete. I am afraid the same may have happened with Line 21 decoders; they just missed the microprocessor evolution.

I can remember 1975 when the state of the art in video-games was a game called "pong". Today you cannot give a pong set away. Today's games, all using microcomputers, boast multiple colors, realistic sound and animated graphics. The difference between Line 21 decoders and teletext is roughly the same. On one hand you have a device that is mono function, captioning and scrolling text; on the other hand you have a system that can do captioning and data base retrieval, home shopping, home banking and game playing, all in color and with high resolution graphics. The only problem is that

today Line 21 decoders are in the marketplace and, because of the newness of the teletext technology, relatively fewer teletext decoders have been introduced.

That is true today, but will not be true in a few years. Already prototype decoders have been shown by major consumer electronics companies, including ourselves. While I am not prepared to give you a specific date when VSA will introduce its latest decoder into the U.S. market (our competition would love to know that and we believe in competition) I can tell you today about a related development that will have an impact on our activities in the US.

Our developments in the captioning arena have been helped tremendously by the activity our parent companies are undertaking in France. Although some may ask what activities in France have to do with captioning for the hearing impaired in the U.S., I would like to take a minute and show why it may be very important.

As I mentioned earlier, NABTS, the standard endorsed by CBS and NBC and many other major manufacturers, was developed by taking the best features from three systems and adding whatever was needed to make the product the best for the US. One of the three systems was the French Antiope Didon technology. After the creation of NABTS, France endorsed a subset of NABTS as its national standard. In fact, the only major difference between the subset being used in France and

the subset used for captioning is the high resolution graphics which some say are not immediately required for captioning activities. The French standard includes all of the multiple language captioning capabilities of NABTS as well as the use of color for captions, etc. The commonality of the two standards means that the technological base on which French decoders are built is similar to that which would be required in the U.S.

This becomes very interesting when one looks at the commitment the French government has made toward the hearing impaired. In all industries that depend on two or more groups working together there is the traditional problem of syncronizing development. In other words, it serves no end if you produce television pictures in color and there are no color sets to receive them. This phenomenon has been called the "chicken and egg syndrome". France is no different, and even though French channel 2 is now captioning with teletext 2 hours of programming per week, soon to be increased to 4 hours, without substantial numbers of decoders to receive the captions it is an effort appreciated by very few.

To solve this problem the French Broadcasting Authority, TDF, has placed an initial order for 30,000 teletext decoders deliverable in the beginning of 1984. Thomson, our major shareholder, has received the order and has commenced mass

production of decoders which will sell in France for 1200 French Francs, or $150, factory cost.

Decoders manufactured using this technology will be available for the U.S. market either through direct French production (in France or the United States) or through license of the French technology to U.S. manufacturers.

In closing, I would like to reaffirm my company's support for teletext and teletext captioning. We feel we are at the start of a promising era in a new market. The first consumer teletext decoders have just started appearing, or will be appearing in 1984. We are all looking forward to this new consumer electronics product.

Thank you.

BIOGRAPHY - GREGORY W. HARPER

Gregory W. Harper is the Vice President for marketing and product definition for Videographic Systems of America ("VSA"). In that post, which he has held for the past year, Mr. Harper is responsible for market strategy and product definition. Prior to the post at VSA Mr Harper was President of Antiope and Telematics Corp. the US marketing arm for the French Antiope teletext technology. While with Antiope Mr Harper participated in the writing of the NABTS teletext specification and was project manager for the French broadcasting authority, TDF, in the Los Angeles Teletext Market Tests. Mr. Harper has been involved with teletext since 1978 when he started working on some of the early teletext tests.

Mr. Harper is a former television producer, producing national shows for commercial and public television. Mr. Harper is president of his own consulting firm, Com/Tech Communication Technologies Inc., and in that position has served on numerous standards committees including the Electronic Industries Association's (EIA) teletext steering committee, numerous EIA technical working groups on teletext, the U.S. State Department Videotex Technical Experts Panel (VTEP) and he has been a member of the U.S. delegation to the C.C.I.T.T. and C.C.I.R. on issues regarding videotex and teletext. Mr. Harper has written many papers on the subject of teletext and videotex and is particularly interested in the development of US standards. Mr. Harper is a graduate of Amherst College.

Mr. DYMALLY. Thank you very much.

Mr. Harrington.

Mr. HARRINGTON. My name is Earl Harrington. I am director of television product planning for Zenith Radio Corp. Let me just say it is an honor to be able to attend these hearings and I hope we can contribute something useful.

Broadcast teletext offers more than just captioning service opportunities for hearing impaired viewers. Other information sources such as news, weather, business, and sports lend themselves very nicely to broadcast teletext delivery. Of obvious interest to broadcasters is the possibility of advertising support for financing teletext operations.

The limited capacity of the vertical blanking interval concerns both broadcasters and receiver manufacturers such as Zenith. The capabilities of the current line 21 system, while providing a rugged method for transmitting captions, are limited when considering other services and a requirement for VBI efficiency.

Teletext systems being considered for adoption in this country are capable of transmitting approximately 10 times more information, on a line-by-line basis, than the line 21 system.

As an advantage to most hearing impaired, captions will, therefore, consume an almost insignificant amount of the limited VBI resource in a teletext service. This should alleviate concern that commercial use of the VBI will prevent availability of captioning services.

In the hearing prospectus provided, it was stated that the growth of the teletext market has been slowed by the lack of a standard which makes television set manufacturers reluctant to build decoders.

Zenith does not believe that the fundamental problem is a question of system standardization, but rather, the problem is the current cost to implement any of the proposals. This includes the line 21 system, the World Standard Teletext system, developed by the British; or the NABTS system.

At present—at the present time, integrated circuit cost for these systems is in the range of $35 or greater, if available at all. Some examples of the resulting consumer cost are the Sears telecaption decoder at $250, and the Zenith world system teletext decoder model CV550 at $299. Both these models are offered using current state-of-the-art technology by companies involved in the competitive consumer marketplace.

As stated, we feel that it is not the choice of a system, but the cost to the consumer, which will determine the acceptance of these services. Only by having a mass market penetration will broadcasters be encouraged to pursue offering services which are attractive to hearing as well as hearing impaired consumers. Mass market penetration will not occur with today's prices.

An important change in television receiver design is on the immediate horizon: digital television. Based on ITT's digital TV chip set, as well as other efforts underway, one can expect TV receivers to appear on the market in the next year based on these digital designs.

The nature of the signal processing within this type of design leads to the opportunity for a low-cost teletext chip option. In fact,

ITT has announced the MAA2700 teletext decoder chip for world system teletext. This is the first alternative for even a built-in VBI based text which can be offered at very low cost to the consumers—a cost significantly lower than the $150 you have heard mentioned earlier.

While it is premature to predict the future of teletext in this country, the use of the ITT chip set by various TV manufacturers, coupled with the availability of the MAA2700 may lead to a de facto standard of world system teletext strictly as a result of its cost effectiveness.

The uniform popularity of the world system British teletext on an international basis, with millions of receivers already in service, points to its utility as an optimized VBI text system.

Additionally, conversion of line 21 captions to world system transmissions has previously been demonstrated as being a straightforward procedure.

In summary, Zenith is a supporter of the VBI text with the belief that the cost of the decoder must be very low, to promote widespread penetration into the consumers' homes. Only with an attractive population of households will broadcasters go forward with the teletext services which will benefit all concerned, both hearing and hearing impaired alike.

Mr. WALGREN. Thank you very much.

Mr. Murphy.

Mr. MURPHY. My name is Ed Murphy. I am the president of EEG Enterprises in Farmingdale, N.Y.

EEG is active in the design and manufacturing of television vertical interval encoding and decoding equipment.

Mr. DYMALLY. Mr. Murphy, could you put the microphone a little closer, please? Thank you.

Mr. MURPHY. Because we are active in both line 21 closed captioning and NABTS teletext systems we believe we have a unique, and in a sense unbiased, viewpoint to evaluate the attributes of both systems.

In contrast to the adversary positions that some have taken in this controversy, it is our position that these two systems should and ultimately will coexist. We believe this because the two systems serve two distinct purposes, and serve two different viewer groups.

Mr. DYMALLY. Mr. Murphy, forgive the interruption. Do you have copies of that for the committee?

Mr. MURPHY. Yes.

Mr. DYMALLY. OK.

Mr. MURPHY. They were on the table over here before.

Mr. DYMALLY. I see. Would one of the staff persons get a copy, please, because I don't have one. Thank you.

Mr. MURPHY. Line 21 captioning is essentially a low-speed program-related service intended for special viewers, the hearing impaired .

Canada has taken the position already that line 21 service and teletext will coexist and is now transmitting both of those services in the vertical interval.

Teletext is essentially a high-speed nonprogram related service, intended for either the general public or special private commercial users.

An interesting point, which has been missed by most of the teletext people, is that line 21 captioning is most often encoded off-line, either by broadcasters or post-production houses long before a show is actually aired. An encoded video tape is prepared at that time. This can then be aired by any broadcaster without the need for any special equipment in their studios.

The recording of line 21 code is very easy because the data rate is low and, in fact, it can be recorded on any one-half inch consumer grade video tape recorder.

Teletext is a very powerful high-speed data transmission scheme. The clock runs about 12 times the rate of the line 21 system and 11 television lines—10 through 20—are available for it, although not all of those lines are currently authorized for its use.

Teletext certainly is easily capable of carrying the captioning data, but remember, its primary task is as an electronic magazine carrying timely information. It, in fact, is encoded on the video signal by an on-line, real-time encoder. Captioning carried by teletext must, therefore, be added to the data stream in such an encoder.

This requires an at-the-time-of-broadcast encoding operation; not required by the line 21 system. Any broadcaster who wishes to caption via teletext must have a teletext encoder in his station to merge the captions into the teletext data.

He must also have a source of caption data—that is, captioning disk, time code user bits source, et cetera. Furthermore, teletext captioning cannot be recorded on present day consumer machines.

An interesting idea emerges from this debate. Preserve line 21 for closed captioning; there can be no argument that it does a very good job at this. If some broadcasters wish to caption by teletext as well, they need only read line 21 and transencode in their teletext encoder.

The 70,000 viewers who have purchased captioning decoders are not shut out and future teletext encoder buyers avail themselves of that—of the same captioned programing if they choose that option.

I would like to take one moment of my time to let my wife, who is a registered nurse, relate a story that happened at St. John's Episcopal Hospital in Smithtown, N.Y.

Mr. DYMALLY. Proceed.

[The prepared statement of Mr. Murphy follows:]

STATEMENT BY:

EDWARD A. MURPHY
PRESIDENT
EEG ENTERPRISES, INC.
1 ROME STREET
FARMINGDALE, NY 11735

TECHNICAL DISCUSSION

EEG is active in the design and manufacturing of television vertical interval encoding and decoding equipment. Because we are active in both the Line 21 closed-captioning and NABTS teletext systems we believe we have a unique (and in a sense unbiased) viewpoint to evaluate the attributes of both systems. In contrast to the adversary positions that some have taken in this controversy it is our position that these two systems should and ultimately will coexist. We believe this because the two systems serve two distinct purposes, and serve two different viewer groups.

Line 21 captioning is essentially a low-speed program-related service intended for special viewers, the hearing impaired.

Teletext is essentially a high speed non-program related service intended for either the general public or special private commercial users.

Line 21 captioned programming is most often encoded "off-line" either by broadcasters or post-production houses long before the show is actually aired. An encoded video tape is prepared at that time. This can then be aired by any broadcaster without the need for any special equipment in his studios. The recording of Line 21 code is very easy because the data rate is very low.In fact it can be recorded and played back on any 1/2 inch consumer video tape recorder.

Teletext is a very powerful high speed data transmission scheme. The clock runs about 12 times the rate of the Line 21 system and 11 television lines (10 through 20) are available for it, although not all these lines are currently authorized for use. Teletext certainly is easily capable of carrying the captioning data, but remember its primary task is as an electronic "magazine" carrying timely information. It is encoded on the video signal by an on-line,"real time" encoder. Captioning carried by teletext must be added to the data stream in such an encoder. This requires an "at the time of broadcast" encoding operation--- not required by Line 21. Anybroadcaster who wishes to caption via teletext must have a teletext encoder in his station to merge the captions into the teletext data. He must also have a source of caption data.(captioning disk, time code user bits, etc.). Furthermore teletext captioning cannot be recorded on present day consumer machines.

An interesting idea emerges from this debate. Preserve Line 21 for closed-captioning; there can be no

argument that it does a very good job at that. If some broadcasters wish to caption by teletext, as well, they need only read Line 21 and trans-encode in their teletext encoder. The 70,000 viewers who have purchased captioning decoders are not shut out and future teletext encoder buyers avail themselves of the same captioned programming if they chose that option.

COMPANY BACKGROUND

EEG has been designing and manufacturing quality products for television broadcasting, cable television, microwave distribution, telecommunications and the audio-visual industry since its inception in 1969. These products have provided reliable signal processing, control and special test equipment capabilities for customers ranging from major broadcast networks and cable multiple system operators to independent production and post production groups.

The concept of digital data transmission within the structure of the composite television video signal has enabled EEG to blend its unique skills in both analog and digital electronics to produce operational hardware for both teletext and closed-captioning systems. We have been active participants in and contributors to these developing technologies since 1975, when we designed and manufactured key sub-system modules for the Reuters-IDR full field teletext Series 3 terminals. Subsequently we participated in the development of the Line 21 Closed-Captioning system for PBS. EEG supplies Line 21 encoding and decoding equipment to ABC, PBS, NBC and many independent TV stations and post-production companies in the U.S. We have also supplied the equipment used by CBC, CTV and the Canadian Captioning Development Authority in Canada as well as customers in Brazil and Japan.

We are currently working on the development and manufacture of vertical interval data transmission and control systems for ABC and the Connecticut Cable Interconnect as well as teletext encoding equipment for NBC.

In addition to its standard products, EEG also provides hardware and software design engineering services to other organizations on a contractual basis. We also supply OEM subsystem components to meet other manufacturers specifications.

EEG is a privately owned corporation located at 1 Rome Street, Farmingdale New York 11735. It holds associate memberships in the National Association of Broadcasters and the National Cable Television Association.

BIOGRAPHICAL INFORMATION

Edward A. Murphy is the President and one of the founders of EEG. Mr. Murphy is a graduate electrical engineer (B.E.E., M.E.E.) from CCNY. He held various engineering and engineering management positions with the Sylvania Laboratories, Gilfillan and GTE laboratories prior to his association with EEG. He is a member of Eta Kappa Nu, Tau Beta Pi, and the Socley of Motion Picture and Television Engineers.

Mrs. MURPHY. It is said that a nurse—I'm sorry. It is said that a nurse remembers special things about each patient, or that she takes something away from each patient she cares for.

I would like to tell you what I remember about one patient I cared for. He was 23 years old. He had cerebral palsy; he was totally deaf. His body was badly contracted and he was paralyzed, retaining only motion in one finger. Most times when I went on duty, I saw him propped up in a high back chair, facing a silent television or looking out the window. His expression was flat, as you can imagine.

I tried everything I knew as a professional to break through that flat expression. But these things are not what I chose to take with me from this patient. They are not what I really remember.

I asked his mother—because I know about captioning because of my husband's involvement—I asked his mother one day if she knew about captioning and whether she had availed herself of that for her son. She turned to him and signing, she said, she is asking about your caption television. His expression changed. I don't know how I can relate it to you. It indicated interest, involvement, maybe even joy. And it's that expression change that I will remember.

Now, this young man would have sat and waited for technology to evolve for him. He had no choice but to sit and wait. But I am glad he didn't have to; and his family, and he's glad he didn't have to wait for that.

Captioning meant a great deal to him because he had a keen mind trapped in a body that could do nothing; couldn't even turn the pages of a book. I am glad he had caption TV.

Mr. DYMALLY. Thank you very much.

Mr. Chairman.

Mr. WALGREN. Well, I would just like to pursue one thought with Mr. Murphy on this transcoder business and the possibility of having a system that, as I understand it, can access both.

Is that—how technologically feasible is that? Is that going to be an expensive proposition?

Mr. MURPHY. It's hard to give you an exact figure on what that might cost. But it is being done right now in the United Kingdom. And we've sold line 21 decoding equipment, which is being used by a British firm to read line 21 on American program material which is being sent to the United Kingdom. They are then transencoding it in the British teletext system in their vertical interval.

So it certainly is feasible and it certainly is within the realm of financial realizability as well.

Mr. WALGREN. All of the witnesses suggest that we are really on the threshold of major cost reductions in this area. And how do you respond to the feelings of Congressman Bonior who said we have been promised that this was going to develop for a number of years and it just never happens?

Can I direct it to Mr. Harper, and perhaps Mr. Harrington could respond?

Mr. HARPER. I thank you, Congressman.

The—the reason we've been waiting so long is we have been trying to develop a teletext system for the U.S. market that meets the needs of the U.S. market. And integrated circuit manufacturers

are reluctant to start building these very large-scale integrated circuits which represents substantial investments until they are relatively sure of what the standard will be.

The reason that we are on the verge of the low-cost decoders today is because that commitment has been made now by integrated circuit manufacturers and they have actually started and, in fact, brought out prototype circuits which will produce the teletext decoder at a very low cost.

It's the same example that Mr. Flaherty, I believe, gave when he talked about the issue of the pocket calculators. When they first came out I remember paying over $200 for a calculator that barely added and subtracted and had square roots and now you can pick them up on Fifth Avenue, street people selling them for $5. That's because of the large-scale integrated circuits.

It takes roughly 2 years from the decision to actually make this circuit until a product is out with it. So we are now—we've started that procedure and we are very close to production chips.

Mr. WALGREN. Mr. Harrington?

Mr. HARRINGTON. Our statements with regard to cost are similar to Mr. Harper's in one respect but we also are considering the fact that we do see actual functioning digital television receivers in international markets at the present time.

The cost of interfacing the digital processing that's necessary for teletext and caption work with the analog processing that is currently found in most receivers is significant. This cost is reduced tremendously when it is an entirely digital process.

We don't have exact figures yet but we are very optimistic that the cost is going to be reduced significantly in the very near future.

Mr. WALGREN. As I understand it, the- if you wanted universal access, you could either require dual mode transmission with all the captions, I guess both into 21 and into teletext, huh—and/or you could require a—a compatible line 21 teletext system.

What are the differences between those? I guess I don't know enough technology to understand.

Mr. HARRINGTON. If I could be permitted to offer a little bit of information—remember, I am in the marketing department of my company, not the engineering department—but as I understand it, there are two different ways to handle this problem.

One is this transcoding which is in operation, as a matter of fact, in Cincinnati right now, where captioning is picked up and off 21 and laid down in the text area. This is a system that allows the built-in teletext or the add-on teletext box to do all the work for you. You don't need a separate decoder.

The second method is to create a decoder that will handle both line 21 system and the teletext system.

As you've heard, they operate under different protocols; they work off different lines in the television field, et cetera. This would add to the cost of the unit if we had to include both types of decoders.

I don't think there is much disagreement here that line 21 has served a very valuable purpose and should continue in order not to obsolete the product that is out there.

What we are suggesting is that there are ways to benefit from line 21 and insert it into the text service.

Mr. WALGREN. Do you feel that it is essential for the Congress to—to choose one system to go forward with, not between 21 or teletext, but to lay down requirements that every effort in this area will be compatible; or is there the danger of division if left alone? And division so completely that there wouldn't be the necessary volumes involved?

Mr. MURPHY. I don't think there's any danger at all that there will be any such division. They are really two independent services and there's no reason why they cannot coexist side by side. There's no technical conflict.

Mr. WALGREN. Would it be helpful to mandate a merger of some kind——

Mr. HARPER. Between——

Mr. WALGREN [continuing]. Where you could read both or receive both?

Mr. HARPER. Between teletext and line 21?

The cost benefits, I think, would be hurt by a merger. The technologies are sufficiently different that it is either one or the other.

On the transmission side, you can broadcast both. But on the receiving side, you really should only build one type of decoder, either the line 21 or the teletext.

Mr. WALGREN. Thank you, Mr. Chairman.

Mr. DYMALLY. Yes, Mr. Chairman.

Is that a situation analogous to Betamax and VHS?

Mr. HARRINGTON. I would say not very closely analogous, no. As you know, you—you cannot play one tape on another machine unless the formats are the same. If you looked at those systems and assume that you took your VHS tape and dubbed it to your Beta format and then played it back on Beta, I think that's—that's one of the options that we are suggesting.

It is not a matter of total incompatibility. People have line 21 decoders, they will have teletext decoders. If we make the same service available on text that is available on line 21, they will have the option of using whichever they would like.

Mr. MURPHY. But this is exactly what Canada has decided to do right now. Canada has a Telidon teletext service. They are captioning in that service and they are also transmitting line 21.

Mr. DYMALLY. One final question.

I know manufacturers don't like the Congress to mess around. You think there might be need to mandate some part of this technology as we did with UHF?

Mr. HARPER. It would probably be helpful to decide on a teletext system. The present decision by the Federal Communications Commission has left the choice of a technical standard up to the marketplace, which means that it's entirely conceivably that you could buy a teletext decoder in one market that would not work in the other.

It turns out that there is one service that—at least we feel—that has a slight advantage, and that it's being broadcast by both NBC and CBS and has been endorsed by the Canadian as their national standard, which means it's receivable all along the border States. Whereas, the NABTS technology, which is also the same technology that AT&T and Time have endorsed for their teletext services and videotex services by Knight Ridder, Times/Mirror and others.

So there is one standard that has received rather large endorsement from many players. But there is another standard out there also: The World System Teletext Standard, which is being used in Cincinnati, which is incompatible. I think if the Congress—the Federal Communications Commission were to have decided between one or the other, I think we would have moved ahead faster on the teletext issue, and we might not be having this hearing today.

Mr. MURPHY. I agree with that. I think the FCC was derelict, really, in letting the marketplace decide a technical question.

Mr. DYMALLY. Thank you very much.

Mr. MURPHY. Thank you.

Mr. DYMALLY. We will now go to the consumer group.

Shall we flip a coin or shall we start off with Mr. Ball?

STATEMENTS OF E. MARSHALL WICK, CONSULTANT, WASHINGTON, D.C.; JOHN E. D. BALL, PRESIDENT, NATIONAL CAPTIONING INSTITUTE, FALLS CHURCH, VA.; ALBERT T. PIMENTEL, EXECUTIVE DIRECTOR, NATIONAL ASSOCIATION OF THE DEAF, SILVER SPRING, MD.; TERRENCE J. CONNELLY, VICE PRESIDENT, TELEVISON NEWS, TAFT BROADCASTING CO., CINCINNATI, OHIO; SHELLEY R. ISAACSON, DIRECTOR, ELECTRONIC TEXT SERVICES, WGBH EDUCATIONAL FOUNDATION, BOSTON, MASS.; AND MERVIN D. GARRETSON, SPECIAL ASSISTANT TO THE PRESIDENT OF GALLAUDET COLLEGE, WASHINGTON, D.C.

Mr. BALL. Maybe alphabetically I would be at the top of the list anyway.

Mr. DYMALLY. Then obviously we will start with Z, then, huh? [Laughter.]

Well, start off, Mr. Ball. Do you want to——

Mr. BALL. I believe with the permission of the Chair, Mr. Chairman, pro tem, I guess, I've been allowed to allocate a small portion of my time to Mr. Connelly here, who is from WKRC-TV in Cincinnati.

Mr. DYMALLY. Fine.

Mr. BALL. I would like to do that immediately.

Mr. DYMALLY. Very well. Let me again remind the witnesses, since there are so many of you, that we need to expedite our testimony. And if you have lengthy testimony and you wish to enter it into the record, we will so do and then you can summarize. If, however, you can't do so, we will ask that you proceed.

Mr. CONNELLY. Thank you, Mr. Chairman.

My name is Terry Connelly. I am vice president of Television News for Taft Broadcasting, headquartered in Cincinnati, Ohio.

I appreciate the opportunity to speak to you briefly about the Taft Broadcasting teletext operation in Cincinnati and its benefits for the hearing impaired.

Taft has been a pioneer in the development of a locally provided teletext service in the United States and in the transcoding of line 21 captioning for the hearing impaired on its operational teletext service.

Both the teletext and the transcoding technologies used by Taft are known in this country as World System Teletext. In contrast to the competing teletext technology used by CBS and NBC, known as

NABTS, World System Teletext forms the basis for all teletext operations now providing a public service in 14 countries around the world, a total of 2½ million World System Teletext decoders worldwide.

In addition to the Taft operation in Cincinnati, World System Teletext is currently being transmitted in Chicago and Seattle and by numerous cable companies across the country who are retransmitting the national teletext service provided by Keycom Electronic Publishing.

Taft believes that teletext will be an extremely important news and information service for all consumers in the eighties and particularly the hearing impaired.

As you have heard, teletext can bring all viewers almost instant access to the latest headlines, stock prices, sports scores, election results, weather, and dozens of other services at the touch of a button. In fact, the only way for hearing impaired or any other viewer to get updated information any faster would be to have a wire service printer in the home.

While Taft believes that teletext is of vital importance for the hearing impaired, it is also convinced that teletext need not and should not impair line 21 captioning services. For this reason——

Mr. DYMALLY. Mr. Connelly? Mr. Connelly? Would you slow down just a little bit? Thank you.

Mr. CONNELLY. For this reason, Taft has pioneered transcoding of line 21 captioning for the hearing impaired on our Electra service in Cincinnati. Taft retransmits the program captioning provided by ABC on line 21 of the vertical blanking interval for receipt by the hearing impaired who have line 21 decoders.

In addition, we have designated a teletext page for a captioning service running parallel to that line 21 service. As a result, hearing impaired viewers in Cincinnati with teletext decoders can simply call up this page on their teletext keypad and receive all line 21 captioning superimposed on the regular television picture.

This has the substantial advantage of permitting hearing impaired viewers to use line 21 decoders or teletext decoders at their option. This transcoding mechanism is readily accomplished by the World System Teletext transmission equipment.

In March 1983, Taft launched the first, and to this date, the only commercial teletext service in the United States.

World System Teletext decoders, manufactured by Zenith, are now available in retail outlets throughout Cincinnati for purchase by the general public.

These decoders are priced at approximately $300, or roughly equal to the cost of line 21 captioning decoders for the hearing impaired. Zenith is the first and only American manufacturer thus far to produce teletext decoders for the home market.

The Taft Electra teletext service is a 100-page electronic newspaper broadcast 7 days a week. Particularly important for the hearing impaired is the immediate availability of late-breaking local news stories, information that directly touches their lives in their own communities.

Taft believes that continuously updated local and regional teletext news pages are the optimum means of insuring that the hearing impaired are continuously informed about local and regional as

well as national events of significant importance to their lives. Locally provided teletext operations such as that provided by Taft are the best means of insuring this availability.

Taft firmly believes that World System Teletext has enormous potential benefits for the hearing impaired, which are not offered by the competing NABTS technology being promoted by the NBC and CBS networks as an alternative to line 21 captioning. Perhaps most important, as stated here before, is the difference in cost for teletext decoders. Because World System Teletext decoders are now available in the consumer market for approximately $300 and will be available, as Mr. Harrington pointed out, for substantially less in the very near future, they permit the hearing impaired to receive the benefits of a full teletext service for approximately the cost of a line 21 decoder.

In contrast, decoders for the competing NABTS technology are not yet available for consumers in any market and manufacturer estimates indicate that once they are, they will necessarily be priced at about $1,000 or higher.

It is clear that this type of cost is so excessive that it effectively precludes the hearing impaired and many others from obtaining the benefits of teletext for the foreseeable future. No American manufacturer is now producing teletext decoders for NABTS.

In sum, there are serious questions as to whether the NABTS technology can provide affordable teletext services necessary for the provision of local news as well as national news to the hearing impaired.

I would like to touch on one final point which Taft views as extremely important for teletext development in the U.S. and, therefore, for its early availability for the hearing impaired .

The FCC has ruled that cable companies may strip broadcaster-provided teletext services before re-transmitting the broadcaster's regular TV programing. Taft and others in this room have requested that the FCC reconsider this decision and that matter is now being—is now pending before them.

Taft firmly believes that cable companies should be required to carry broadcaster-provided teletext services where they carry that stations regular programing unless there is a valid technical reason why this is not possible. Based on Taft's survey of cable operations, including both new and older cable systems, it has discovered no technical or other difficulties with retransmission of the WKRC–TV World System Teletext service.

We believe that carriage by cable companies of broadcaster teletext in local markets is critical to the development of teletext which is still in its infancy in this country and, therefore, to the rapid availability of the service to the hearing impaired.

In conclusion, teletext is not a technology of the future. With World System Teletext the hearing-impaired community can be, and is being, served today. But no one can be served by teletext in the foreseeable future if the CBS and NBC-supported NABTS approach is pursued.

Thank you very much.

[The prepared statement of Mr. Connelly follows:]

TESTIMONY BEFORE THE
SCIENCE, RESEARCH AND TECHNOLOGY SUBCOMMITTEE
OF THE HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY
BY TERRY CONNELLY, VICE PRESIDENT OF TELEVISION NEWS
TAFT BROADCASTING COMPANY, CINCINNATI, OHIO
NOVEMBER 9, 1983

Good Morning!

It is a pleasure to have the opportunity to speak to you briefly about the Taft Broadcasting Company teletext operation in Cincinnati and its benefits for the hearing-impaired.

Taft has been a pioneer in the development of a locally provided teletext service in the United States and in the transcoding of Line 21 captioning for the hearing-impaired on its operational teletext service. Both the teletext and transcoding technologies used by Taft were pioneered by the British and are known in this country as World System Teletext. In contrast to the competing teletext technology, known as NABTS, World System Teletext forms the basis for all teletext operations now providing a public service in 14 countries around the world. In addition to the Taft operation in Cincinnati, World System Teletext is currently being transmitted in Chicago and Seattle and by numerous cable companies across the country who are re-transmitting the national teletext service provided by Keycom Electronic Publishing and Satellite Syndicated Systems, Inc. known as the Keyfax teletext service.

Taft believes that teletext will be an extremely important news and information service for all consumers in the '80s and particularly the hearing-impaired, since teletext information is equally available to hearing-impaired members of the public. Teletext can bring all viewers almost instant access to the latest headlines, stock prices, sports scores, election results, weather and dozens of other services at the touch of a button. In fact, the only way for hearing-impaired and other viewers to get updated information any faster would be to have a wire service printer in the house.

While Taft believes that teletext development is of vital importance for the hearing-impaired, it is also convinced that teletext need not and should not impair the Line 21 captioning service. For this reason Taft has pioneered transcoding of the Line 21 captioning for the hearing-impaired on its Electra teletext service. Taft re-transmits the program captioning provided by ABC on Line 21 of its vertical blanking interval for receipt for the hearing-impaired with Line 21 decoders. In addition it has designated teletext page 010 for a captioning service running parallel with the Line 21 service. As a result, hearing-impaired viewers in Cincinnati with teletext decoders can simply call up this page on their teletext keypad and receive all Line 21 captioning superimposed on the regular television picture. This has the substantial advantage of permitting

hearing-impaired viewers to use Line 21 decoders or teletext decoders at their option. This transcoding mechanism is readily accomplished by the World System Teletext transmission equipment.

Taft's Cincinnati television station WKRC-TV has been operating its "Electra" teletext service since July, 1982. In March, 1983 Taft launched the first and to this date the only commercial teletext service in the United States. World System Teletext decoders manufactured by Zenith are now available in retail outlets throughout Cincinnati for purchase by consumers. These decoders are priced at approximately $300, or roughly equal to the $250-$300 cost of Line 21 captioning decoders for the hearing-impaired. Zenith is the first and only American manufacturer thus far to produce teletext decoders.

The Taft Electra teletext service is a 100 page electronic newspaper broadcast seven days a week. The entire service is locally produced as part of the station's news operation. It features 65 pages of hard news updated throughout the day and provides a 35 page "back" section consisting of softer news, schedules of community events, TV and movie listings, puzzles, jokes, games, educational items, how-to features, recipes and other useful stories. An index is provided with each section.

Particularly important for the hearing-impaired, in Taft's view, is the immediate availability of late breaking

local news stories on its Electra service. Research among users of Taft's teletext service indicate that news pages are accessed more often than any other type of information and that local news, sports and weather are used more often than national pages in most cases. While captioning has been implemented for live newscasts on a national basis, there is inherent difficulty in producing adequate captioning at the pace necessary for live newscasts and the national services do not provide captioning of local news. Taft believes that continuously updated local and regional teletext news capsules are the optimum means of ensuring that the hearing-impaired are continuously informed about local and regional as well as national events of significant importance to their lives. Locally provided teletext operations such as that provided by Taft are the best means of ensuring this availability.

Taft firmly believes that World System Teletext has enormous potential benefits for the hearing-impaired, which are not offered by the competing NABTS technology being promoted by the NBC and CBS networks as an alternative to Line 21 captioning. Perhaps most important is the difference in cost for teletext decoders. Because World System Teletext decoders are now available for approximately $300 and will be available for substantially less in the near future, they permit the hearing-impaired to receive the benefits

of a full teletext service for approximately the cost of a Line 21 decoder. In contrast, decoders for the competing NABTS technology are not yet available for consumers in any market and manufacturer estimates indicate that, once they are, they will necessarily be priced at $1,000 or higher. It is clear that this type of cost is so excessive that it effectively precludes the hearing-impaired from obtaining the benefits of teletext for the foreseeable future. No American manufacturer is now producing teletext decoders for NABTS.

In sum, there are serious questions as to whether the NABTS technology can provide the multiple local teletext services necessary for the provision of local news and information to the hearing-impaired, particularly since that technology does not form the basis for any teletext operation providing a public service in any country around the world.

I would like to touch on one final point which Taft views as extremely important for teletext development in the U.S. and therefore for its early availability for the hearing-impaired. The FCC has ruled that cable companies may strip broadcaster-provided teletext services before retransmitting the broadcaster's regular TV programming. Taft and others have requested that the FCC reconsider this decision and that matter is now pending before them. Taft firmly believes that cable companies should be required to

carry broadcaster-provided teletext services where they carry the station's regular programming unless there is a valid technical reason why this is not possible and the technical problem cannot reasonably be corrected. Based on Taft's survey of cable operations in the Cincinnati area, including both new and older cable systems, it has discovered no technical or other difficulties with re-transmission of the WKRC-TV World System Teletext service. We believe that carriage by cable companies of broadcaster teletext in local markets is critical to the development of teletext which is still in its infancy in this country and therefore to the rapid availability of the service to the hearing-impaired.

BIOGRAPHICAL INFORMATION

Terry Connelly
Vice President of Television News
Taft Broadcasting Company
Cincinnati, Ohio

Current position since March 1980: Responsibilities include the corporate administration of Taft's television and cable news operations as well as news development projects, such as teletext.

Taft is an integrated communications and entertainment company, involved in commercial television and radio broadcasting, cable television, regional themed amusement parks, television program and motion picture production and television program distribution. Taft owned television stations are: WBRC (ABC), Birmingham; WKRC (ABC), Cincinnati; WTVN (ABC), Columbus; WDAF (NBC), Kansas City; WCIX (Ind.), Miami; WTAF (Ind.), Philadelphia, and WDCA (Ind.), Washington D.C.

Prior to his corporate staff position with Taft, Connelly was Executive News Producer for WMAQ-TV, the NBC-owned station in Chicago. In addition to overseeing the production of the daily newscasts at WMAQ-TV, Connelly produced coverage of many special events and was one of those nominated for a National Emmy for producing NBC's spot news coverage of the DC-10 plane crash in Chicago in May 1979.

Since entering broadcast journalism in 1968, Connelly also has worked as a reporter, anchorman, producer and news director at television stations in Kansas City, Milwaukee, Albany, New York and Champaign, Illinois.

His awards include Milwaukee Press Club Honors for Best Television Documentary in 1971 and Missouri Broadcast Association Honors for Best Newscast in the State in 1977.

He serves on the National Broadcast Advisory Board of United Press International, is an Executive Board Member of the Cincinnati Chapter of the Society of Professional Journalists/Sigma Delta Chi, and is also a member of the Radio Television News Directors Association. He holds a Bachelor of Science degree in Communications from the University of Illinois.

Mr. DYMALLY. Mr. Ball, let me skip you and come back later. Let's go on to Mr. Wick.

STATEMENT OF E. MARSHALL WICK WAS GIVEN THROUGH AN INTERPRETER, RONALD COFFEY, GALLAUDET INTERPRETER SERVICES, ASSISTED BY WILLIAM ISHAM, STAFF INTERPRETER*

Mr. WICK. My name is E. Marshall Wick. I am involved in a number of organizations related to deafness but I am not here today to speak for any of them. My comments today are strictly my own comments.

Now, I am going to skip part of my paper to get to the meat of what it is I would like to talk to you about or present to you today. And one point is that the line 21 system has and is serving deaf people and has done it well, and there's no question about that. And it will continue to serve deaf people well in the future if certain steps are taken to make that possible. And Congress should continue to consider that.

The issue here is not whether one technology is better than another one, from my viewpoint. And the issue is not whether one system is or whether it will become obsolete. The issue here is whether or not we will be able to make television more accessible to deaf people. The issue is not whether we are going to make more television—accessible to television, but make television more accessible to deaf people, not deaf people more accessible to television.

Maybe I've exaggerated a little bit on that point but that is the meat of my discussion. As all of the speakers up to now have talked about the number of deaf people who are being served now, it seems very small. It seems like they've just scratched the surface. And I would agree with that and I think that all deaf organizations would agree with that, and would like more use of that.

But my personal opinion is that almost entire—it's almost entirely related to the cost involved in captioning at the present time—the cost of two different aspects. One is the cost of the receiving captioning by deaf people and; second, is to produce captioning for broadcasters—equipment for broadcasters.

This morning we mentioned about the 1971 conference, and at that time it was announced that it would be possible to have closed captioning—to close-caption programs within 2 years and would increase to the cost of $20. Now, what happened, very clearly, is that it didn't happen 2 years later, it happened more than 10 years later. And it didn't cost $20 more; it cost $250 more. OK.

Then the survey that shows that 94 percent of the deaf people are willing to buy the decoders was valid but it was valid only in the context of what I just recently mentioned. And at that time, deaf people believed that it would cost $20.

So, yes, I mean, I would buy the decoder if it was $20. I think that still stands today. I think that deaf people would have bought the decoders and would still buy them if it appeared reasonable. And what is reasonable for the people who now have decoders, like myself. I have bought three line 21 decoders. And I think $250 is a

* See appendix II, p. 228, for corrected oral testimony of E. Marshall Wick.

reasonable price for me but I am not the typical deaf person, and neither are the other people here—who are here presently, or who presently own a decoder, who are an affluent group of deaf people, or the innovators.

We are the ones who have been surveyed and will continue to be. And my concerns are not as a present user. My concerns are what are we going to do to make it possible for the masses of deaf people in America to have all the benefits to learning about—or to obtain access to television. How can we make that possible?

Four years later, we see that it is not possible—to sell the decoders for $250. It doesn't make a difference whether it is a line 21 decoder or the teletext decoder. That's not the issue. The issue is what is possible in the future to bring down the cost so that the price is not consumer resistant.

There's no hope at the present time that line 21 would be able to do that, except for Congress to purchase the decoders and distribute them, or to make a complete—to make it a complete tax-exempt item.

If it's left to the market, it will never change. That is not to say that things haven't been done to try and cut down the cost—they have been. Two hundred and fifty dollars for the decoders this year, and that—that's the same price it was 4 years ago even though manufacturing has gone up. And they have found ways—tried to find ways to cut the cost, but still it's a level far too high for most deaf people—people that we should be concerned about.

I believe that teletext offers a promise and I agree that teletext doesn't really—is not the present thing, but it's a future item. Some say 2 years, some say 5, some say 10. But that's not the issue to me.

The issue is what it is we are doing right now to make sure that that future goal will be open to deaf people. The arguments about what the networks are doing right now, again, I don't think that's really an issue. The ABC and—ABC and PBS both say that they feel that the present system is serving them well. But they are not really getting involved in the new technologies or dividing the resources. And they expect to spend money on the development and what they have when we have the present technology that is serving us well, I agree with them completely.

The present system has to be maintained. There's nothing better right now than ABC or PBS's system.

The argument here is what is CBS doing or not going to do. In this area, I must say that I disagree with the approach that most organizations of deaf people have taken in this matter. And I feel in a sense that ABC should not spend resources on new technologies but CBS should be focusing their attention to new technologies to make sure that the future will come to deaf people. It won't happen by itself. They must do something about that. CBS has been doing something about it.

And what's 5 more hours of programing at the present compared to future benefits that may be coming from CBS's work? I will be among the first to criticize CBS because they've shown themselves to be completely insensitive to deaf people or how they approach deaf people and deaf organizations. Their public relations efforts are lousy but I won't allow that distract from my viewpoint that

they have done tremendous service to deaf people by trying to make the future more accessible to deaf people.

It doesn't matter to me whether that happens 2 years from now, 5 years from now. But what's important to me is that it does happen. And what happens is that if some groups don't do development work—it won't happen. So let ABC and PBS and NBC continue with their captioning and let Congress make sure that TV is accessible to the deaf clients because they have the decoders. And those who have the decoders now can continue to use them. That is—that point is necessary.

But let's do more than that. Let's make sure that new technologies that's promised now, is developed for the future.

Second, the part of the technology that is the cost of captioning in itself—we have to find ways to improve the cost of captioning. And one way, in the paper that is attached to my presentation, talks about voice recognition. This is an infant technology at the moment but the time is now to start exploring that issue—exploring the ways to harness that type of technology to the benefits of captioning and to make sure that a large number of captioned programs are accessible to deaf people.

When the cost comes down a captioning at that time, it will be much easier for deaf organizations to pinpoint the needs of corporate responsibilities for all the networks. The networks have a corporate responsibility—that's very clear. But exactly what is the line of responsibility—that issue is not—it's not clear. It's not an issue that I want to get involved in. I think it's better to discuss—have it discussed by organizations of deaf people that have representatives, for example, the NAD [National Association of the Deaf].

OK, now if we find the means to reduce the cost to the consumers, then we can reduce the costs to produce the captions also. Then the number of programs available, which I am saying is more television accessibility, will be more accessible. And what I mean by that, I mean that deaf people will be able to see the captions. Deaf people who don't have decoders can't see the captions; and when you see the captions it increases the understandability by 50 percent. And when the deaf don't have a decoder, it doesn't make TV more accessible.

I would like to stress another point, and that is I think it is the responsibility of Congress—and should be the responsibility of the organizations of deaf people—to make sure that TV accessibility is accessible to all people, not just a few of the wealthy deaf people.

I believe that the systems can exist. And I don't want to get into an argument or in depth about the transcoding or the problems of doing that, or any of that, but it can be done. Now, how it can be done is another matter—but that it does coexist. The dual mode captioning makes that possible. And that's what we have here now today.

Congress may want to consider the possibility of requiring dual mode captioning such as the NAD will suggest in their presentation.

Now I want to go beyond that just a little bit and mention that I mention in my paper that both England and France have enacted regulations to have the decoder system include teletext for a future

date—probably in 1985; the same way that Congress acted on regulations to have all—in the same way that all television systems are not required to have UHF or VHF.

Now we are coming to the point of really talking about mass production and mass distribution. And when you talk about millions, then you start talking about LSI chips that were mentioned this morning.

Now, the LSI chips—I mean, you are not talking about 100,000 sales within the—100,000 sales isn't enough to support that type of development. Where are we going to get 1 million, 5 million, or 10 million consumers for the LSI chips? Not from deaf people. And certainly at the beginning prices now and not by the prices that are going to be in a few years before the cost goes down, as it did before.

Now, that's not stopping us from the present to worry about the future. Let's work towards the future now. And that's the point of my presentation to you, gentlemen, to make sure that the future is accessible to deaf people at the present and not wait for the future to come by itself.

But CBS did not experiment with teletext and they didn't make sure that teletext was included in captioning as part of the basic design of the keypads—the system itself. And even when teletext comes out, it will still—it still won't be accessible to deaf people. But CBS's efforts in that effort—then they are making sure that it will be accessible. So I can't criticize them for that.

I will continue to criticize them for their insensitivity. I don't think they have any more understanding of how deaf people in their requests, or how to deal with deaf people. And I think their public relation efforts aren't that good. And I will emphasize that again. But that on the line something has to be done to insure that technical development is done and that CBS is doing that.

The Congress also should consider other ways to make sure that the technology process occurs and that it really becomes accessible to the general deaf population, not to just a limited number of people who can afford television.

Thank you.

[The prepared statement of Mr. Wick follows:]

STATEMENT
of
E. MARSHALL WICK

Re: Developing Technologies for Television Captioning:
Benefits for the Hearing Impaired

My name is E. Marshall Wick. I am an Associate Professor of Business Administration at Gallaudet College here in Washington. I am President Emeritus of the Canadian Association of the Deaf (and formerly Chief Executive Officer of this consumer organization for 17 years) and I am on the governing bodies of 5 associations with national programs in the United States and Canada including the Canadian Captioning Development Agency. I am Vice Chairperson of the Visual Media Services section of the National Association of the Deaf. I thus have both extensive and intensive involvement with a wide variety of associations with varying perspectives of the issues related to technology. I am, however, representing none of them today. My comments, while indeed also refecting the thoughts of some other informed deaf persons, should be taken to reflect the opinions of an individual (albeit a deaf consumer) who has done considerable research over the past 8 years into the issues at hand.

I wish to thank the Committee for providing deaf persons themselves with the opportunity of participating in this forum of information gathering about the technologies in order to assure that the best interests of the hearing impaired will be served since this is also intended to establish a hearing record upon which future recommendations may be based.

I will not attempt to cover in this testimony itself much of the background information needed to understand the context of some of my comments. I am,

however, attaching some material which will adequately provide this background and this paper will get right down to the nitty gritty of the issues raised by the Subcommittee. Your attention is especially called to the paper I presented at the World Congress of the Deaf in Palmero, Italy this past summer, "Electronic Communications: The Converging Technologies".

In my opening statement I mentioned that I was involved with many different organizations with varying persectives of the issues. I would like to stress at this point, however, that we are all in agreement that television is not presently adequately accessible to the deaf community and it should be made much more so accessible. It is also true that all organizations support closed captioning as a means of making television more accessible. Not everyone agrees that closed captioning is the only or, indeed, the best means of making it accessible however--there are those feel that captions should be open, there are those who feel that there should be original programming in sign language and there are those who feel that interpreted programming can meet the needs of deaf persons without the need for deaf persons to make an additional investment in specialized equipment. And, finally, there are those who feel that there should be an appropriate balance between all four means of making television accessible. Having made that point, I will concentrate the rest of this paper on closed captioning.

Prior to getting into the issues related to Teletext, I would like to make clear to the Subcommittee that I believe that the current Line 21 System (which I will hereinafter refer to as the PBS Line 21 System as it was originally known in the industry) is a very good system when measured up to what it was designed to do.

It was designed as a special purpose system to serve the hearing impaired by providing them with program related captions. It was designed with some flexibility (it can provide for some text and it can provide for simulanteous transmission of a second language) and it could have been designed to do many more things but the developers of this system were very much aware of the price sensitivity factors and wisely opted for a limited range of features in order to get a closed captioning system started. The developers were also aware of the trade offs necessary--they were concerned with the need for a robust signal to assure caption accuracy and they used what was then current technology to develop the system equipment. The result was making national prime time programming accessible to the deaf for the first time in history. The PBS System with captioning done by the National Captioning Institute and The WGBH Caption Center has given those deaf persons with Sears Telecaption decoders a good service and the basic wish of those with decoders is that there was more programming available. The original intention of the development has thus been accomplished and all those parties which made this possible--PBS, ABC, NBC, NCI, WGBH, the federal government through the Department of Education and numerous advertisers deserve the praise of the deaf community and indeed several of them have been given this deserved recognition by a number of organizations.

Given this scenario, many may wonder why the deaf community should be interested in or concerned about Teletext and other emerging electronic technologies. The answer lies in the fact that while those who are receiving captioned programs now are being served, they represent a very small proportion of the total hearing impaired population, no matter whose statistics you utilize. There are those who claim that the total market for captioning is the 16 million hearing

impaired population on one extreme and others at the other end who insist that the market is more realistically 500,000 or so, largely from the so-called prelingually deaf population. Regardless of which figure is utilized, the approximately 70,000 decoders sold over the past three years represents only a small proportion of the deaf population who have access to television compared with that of the general population and the reason largely boils down to the cost factors involved. Statistics accumulated by the NCI show that the Telecaption decoders are being largely purchased by relatively affluent and highly educated deaf persons, a large percentage of which also own VCR machines. Accessibility to television by deaf persons should not be limited to the more affluent. Organizations such as the NAD (whose membership comes from the more affluent members of the deaf community) have, in my opinion, devoted too much time and energy protecting the interests of those currently owning Telecaption devices instead of pushing for the development of new technology which will bring television to the have-nots.

Costs are involved in two different areas: the cost of producing captions which has limited the number of productions available and the cost of receiving captions which has limited the number of decoders being purchased. Both costs are currently perceived as high by a large number of the potential broadcasters and the potential audiences although the cost of $2,200 per hour of programming actually represents a very small part of many large budget productions and the $250 cost of a Telecaption device represents a small part of the total family income of many deaf persons. The result is the failure to significantly expand the captioned programming available due to the reluctance of broadcasters to serve what is essentially a very small audience and the further resistance of

deaf persons to purchase more decoders while the amount of captioning remains small. The result could jeopardize the whole future of closed captioning unless some solution is found to cut the costs involved in both captioning programs and in the costs of decoders to receive them.

A number of attempts have been made to do just this. Captioning centers have made the captioning process more efficient as they gained experience. They have worked on the software to reduce the time needed to produce captions. The result has largely been that they have been able to better control the increased costs of captioning but no reduction in the prices charged broadcasters. Decoders which increased in price in retail outlets have been reduced to the original cost of $249 by selling them through non-profit organizations. This, too, has kept the cost down to the original cost in spite of inflation but it too has happened in a period of rapidly falling price for other electronic devices, especially home computers, and the consumer market has been conditioned to expect falling prices which has not happened with the decoders. Attempts have been made to get service clubs to donate decoders to the deaf but this makes access to television more of a charitable cause than a basic human right. Attempts to get the price reduced through a tax credit failed. Decoders were declared deductible as a medical related expense but this benefitted only those who had sufficient income to itemize their deductions and then only if they had considerable other medical expenses. Thus enters Teletext.

It is the opinion of this person that the only hope to make television accessible to the vast majority of deaf persons is by developing a mass market

device intended for the general population which can also be used by deaf persons without modification and its related costs. Teletext holds this promise and the survival and expansion of closed captioning may yet rest with its development. If production was based upon a million units produced, the additional market add-on cost could be brought down to less than $50 per unit and based upon several million units, the add-on cost could be brought down to less than $25 if estimates produced for the FCC Teletext Proceedings and other estimates in the trade press are reliable. And on the other side, because there will be a large market for Teletext encoding equipment, the cost for this will also be relatively low and some captioning can be done at the local level. This will open up competition for captioning services, a very healthy situation which does not presently exist.

Teletext can offer deaf persons many more services than the PBS System can. It can become a visual radio for deaf persons with the ability to instantly call up any type of programming. While Telecaption can offer a text service, it is a fixed mode and specific information cannot be called on demand. These added services are not, in themselves, justification to switching to Teletext but rather add greater value to the purchase of decoders. Teletext also can do much more versatile captioning but again, this is not basic to the issue of making television more accessible. To compare the features of the PBS System and Teletext is not very meaningful when you consider the fact that the PBS System was designed for a specific application. The issue is not really whether one system will so something better--the issue is whether one system will make it possible for the masses of deaf persons (rather than just the affluent) to have access to captioning and it is my opinion that if Teletext is properly

developed to accomodate the needs of deaf persons from the start then it will. I am, admittedly, at this stage in the development of Teletext, one of the few leaders of the deaf community that actually applauds rather than criticizes the decision of CBS to pour its money into developing Teletext for deaf persons instead of putting it into captioned programs. Since the Redskins are currently in vogue, I'll use them as an analogy. Coach George Allen produced great teams but he was characterized as doing so by trading away the future to get the present. Organizations of the deaf seem to be taking the same stance--demanding the present from CBS instead of looking into what CBS is doing as an investment in the future. As I stated in my original comments to the FCC on RM3727 in 1980, "If Teletext becomes a reality and incorporates captioning as an integral part of its standards, it will be the first time in history that a new communication device intended for use by the general population has provision for meeting the special needs of the deaf from the very start". Without the CBS interest in closed captioning, the design of Teletext keypads and decoders would not incorporate captioning as an integral part. If it were not for the CBS experiments in closed captioning on Teletext, even if Teletext were suddenly available today, captioning would still be several years away while a system to develop the process was undertaken. CBS is now capable of doing captions even before the decoding equipment is available for consumers. Perhaps the deaf community will wake up soon to the fact that mortgaging the future of millions to get a few more hours a week of present enjoyment for a few thousand is bad strategy.

It is unfortunate that the FCC did not adopt a single standard to get Teletext off and running. The unsureness of the market has led to the predicted lack of

quick action on the part of manufacturers. It has left the deaf community in the situation of possibly having to buy three different decoders--one for PBS System Captions, one for NABTS System captions and one for CEEFAX/Oracle System standards. And even if transcoding was done it has it necessary to have at least two transcoders. The Canadian Norpak produced equipment solves part of the problem between PBS System and NABTS System incompatability by producing codes for both but that has the effect of reinforcing the NABTS as the defacto standard. Congress may wish to consider legislation which would overrule the decision of the FCC not to select a standard because a standard is the next logical step towards what both the United Kingdom and France are doing: requiring mandatory inclusion of Teletext decoders in all television receivers produced in the future similiar to the requirment enacted many years ago in the United States that all receivers include UHF channels.

The production of captioning is presently labor intensive even though it is assisted by microcomputer software developed to speed up the process. In my WFD paper, I presented a solution to this which is a natural extension to what is now known as "real time captioning"--the use of voice recognition to produce captions and bring the actual cost down to less than $50 per hour of programming from the current rate of over $1,000 per hour. In this paper I made clear that the current state of software development is very much in the beginning stages and a tremendous amount of work must be done to refine it to the point of usefulness in captioning. The technology is there--we just dont know how to exploit it at this point. Your subcommittee may be interested in looking into this and the possibility of the Federal Government funding such research. The government is currently expending large amounts of federal funds to support the present captioning program. The government could save a significant amount of future funds if it presently put more funds into developing the captioning process to largely computerize it. This, coupled with low cost Teletext decoders would make a large number of programs available to a large percentage of the deaf population. Surely this <u>should</u> be the goal of the government when it assists in the captioning process, surely it <u>should</u> be the goal of broadcasters in meeting their social responsibilities and surely it <u>should</u> be the goal of organizations serving deaf persons.

E. Marshall Wick

Biographical Sketch

Born and grew up in Toronto, Canada. Became deaf at age 9 through an automobile accident. Attended the Ontario School for the Deaf, a high school for hearing students then graduated from Gallaudet College in 1962 (B.S. in Business Administration with Distinction). Attended graduate school at American University as a Massey Fellow in 1963 then completed his Master of Business Administration degree at the University of Toronto in 1964. In 1982 he received a Juris Doctor degree from George Washington University Law School.

In 1970 he joined the National Technical Institute for the Deaf in Rochester as Chairperson of the Business Technologies Department, leaving as Associate Professor in 1974. From 1974 to the present he has been a member of the Business Administration Department faculty at Gallaudet College in Washington with the current rank of Associate Professor. He currently largely teaches courses related to Computer Information Systems and Law

His activities in the deaf community have been split between the United States and Canada and he has served on the Board of Directors of more than 10 organizations seeking to better the life of deaf persons in both these countries and throughout the world. In 1981 he was awarded an International Soliditary Medal by the World Federation of the Deaf. He has submitted formal comments to the FCC and the Canadian Department of Communications on a number of issues over the years and has given numerous talks throughout North America in the fields of communications and education.

An expert on Electronic Communication, he has served as a consultant to the Canadian Government.

Attachment 1

Electronic Communication: the Converging Technologies

E. Marshall Wick
Associate Professor, Gallaudet College

This paper is intended to be neither a comprehensive review or an overly technical presentation of the subject matter. A number of other papers have covered some of the topics in greater detail and the author will gladly provide those interested with more specific information on any of the topics covered. Rather, this paper is intended to directly tie the topic of electronic communication into the major theme of the 1983 World Congress of the Deaf: "Reality and Utopia" by presenting some concrete examples of what is already happening then giving some possibilities of the future world of electronic communication.

It took over half a century to adapt the telephone for use by deaf persons, a quarter of a century to adapt television and less than a decade to adapt computer communications. Thus while the gap of time between the emergence of a new technology and its adaptation for use by deaf persons has dramatically diminished, the author feels quite strongly that if more of those working with deaf persons and deaf persons themselves became more actively involved, directly or indirectly, in the development of new technology there would be no gap at all--many new applications of telephone, television and computer communications could include design features which would enable deaf persons to utilize such new technology without the need for additional adaptation and the extra expense that this brings with it. Teletext, as it is being developed in North America, is a good example of such concurrent development for use of deaf persons and hearing persons alike without the need for deaf persons to purchase modified equipment. Also, extended uses of new technology will not occur unless research and development are encouraged by the deaf community. It is the hope of the author that this paper will stimulate interest, discussion and action to make this utopia of future communications a reality.

Telephone Adaptation

The telephone was adapted for use by deaf persons by a deaf person, Robert Weitbrecht by interfacing a commercially obsolete teletypewriter (TTY) and a telephone with a specially modified modem. When the supply of discarded teletypewriters ran low, enterprising businessmen invented portable devices based on the Baudot (5 bit) code used by these teletypewriters with built in modems based on the 45.45 baud Weitbrecht modem. These machines, originally priced above six hundred dollars, sold well and competition has brought the price on new models down to less than one hundred and fifty dollars and introduced a new term TDD (Telecommunication Device for the Deaf). The exact number of TDDs now in use in North America is unknown but there are probably about a hundred thousand of them in use. Even with those numbers, however, only a small fraction of the total number of deaf persons that census figures estimate exist have access to a TDD. Several states of the U.S. and provinces of Canada provide TDDs to deaf consumers at no cost or for a very small monthly fee

and the majority of states and a number of provinces provide for a long distance discount for TDD users since it is estimated that the time for a deaf person to complete a conversation is approximately three to four times longer than by voice communication.

The problem with the Baudot/Weitbretch TDDs, of course, is that they are incompatible with terminals designed for computer communication based on ASCII codes (seven bits plus parity bit) and the standard computer modem based on Bell 103 standards for up to 300 baud transmission. Argument has been advanced that this is irrelevant since the vast majority of deaf consumers do not want to access a computer anyway but this misses out on the point that several million terminals and personal computers now have the potential to talk to each other and the goal of developing communication should not be simply to allow deaf persons to talk with each other but rather should be the broader goal of allowing deaf persons to access the mainstream of society as well as their deaf friends. While many business establishments (American Express, Trans World Airlines, Air Canada, National/europcar to name a few) and most Federal Government departments in both the United States and Canada have a TDD to make them accessible to deaf consumers, the vast majority of business establishments and government offices are still not accessible to deaf consumers, even though they have ASCII/Bell terminals which could make this possible.

A number of TDD manufacturers have now come out on the market with dual mode TDDs which are switchable between Baudot/Weitbretch and ASCII/Bell modes and this may be a promising development in making a transition to ASCII/Bell-only communication which would bring deaf persons into the mainstream of electronic communication. Computer terminals and personal computers capable of functioning as terminals are much cheaper and more versatile since they can be mass produced. A Commodore VIC 20 computer with 5K memory and a modem, which can function as both a personal computer and an ASCII communications terminal can be purchased in the Washington area for less than $175 today.

Television Adaptation

Television was adapted through the use of captioning more than a decade ago. Station WGBH, one of the flagship stations of the American Public Broadcasting Service, established a Captioning Center which initially focused on what is called open captioning (captions are seen on all television receivers whether wanted or not) and pioneered the development of news captioning while Gallaudet College and the National Technical Institute for the Deaf were developing similar open captioning processes, largely for educational use. Due to the fact that open captions allegedly distract hearing viewers, no commercial networks were interested in making their prime time programs accessible to deaf persons through this method since commercial television is a numbers game in North America and the threat of losing viewers was too much for them. This led to the development of what is called closed-captioning (where the captions appear only on the receivers of those who have a special decoder to receive them) by the Public Broadcasting Service using line 21 of the Vertical Blanking Interval.

PBS filed a petition for rulemaking with the Federal Communications Commission on November 6, 1975 and the FCC ruled in favor of setting aside line 21 on

December 8, 1976. Immediately following the FCC decision, the deaf themselves in Canada through the Captioned Films and Telecommunications Program of the Canadian Association of the Deaf in January, 1977 petitioned the Department of Communications to similarly set aside line 21 in Canada and a year later Broadcast Specification 13 did so. On March 23. 1979 the U.S. government announced the establishment in the United States of the National Captioning Institute and subsequently in Canada, the Canadian Captioning Development Agency was established in December, 1981.

Since with closed captioning the captions are hidden and do not distract hearing viewers, the networks in the United States and Canada readily accepted the concept in principle but have not accepted it in practice for the simple reason that captioning is expensive, costing over $2,200 for each hour of programming and has been a relatively slow process, requiring the networks to have the final script of their programs available for captioning several days prior to broadcast which in some cases is very difficult and in others impossible. This led to the development of what is called (technically speaking, wrongly) real-time captioning (to indicate the speed at which captioning can be done--only a two to ten second delay occurs between the time a word is spoken and it subsequently appears on the screen). This is done by using a modified stenotypewriter linked to a computer which searches the appropriate word in computer dictionaries and sub-dictionaries stored on disks and then displays it on the screen. This makes possible the captioning of live events such as the news.

All three captioning agencies in North America NCI, WGBH and the CCDA are interested in further refining such systems. The shortness of time delay and accuracy of real-time captioning is related to the power (access speed and memory size) of the computer and the sophistication of the software and related dictionary and sub-dictionaires which are customized. In the United Kingdon the BBC has also developed a similar system. Approximately 40 hours of captioning per week is being done in the United States (over half of it in prime time) and approximately 15 hours a week of Canadian programming is being done in Canada (which can also get the majority of United States programming giving it access to more captioned programming than any other country in the world). Although the initial intention was that the caption centers become self-sustaining, experience has proved that all centers still need to rely on substantial direct or indirect government support to function.

Approximately 80,000 decoders, which sell for $250 direct from deaf organizations or $290 in retail stores for a standalone attachment, are now in use in the United States and Canada, a number which is very low in comparison with original market projections of at least 100,000 units a year. Two reasons given for the low sales are a perceived high price for the decoder and the relatively small number of highly popular programs which are captioned. A third reason is that some deaf persons are waiting for teletext, which promises to offer a host of other services as well as captioning, to be on the market. Teletext broadcasting has only recently been approved by the Federal Communications Commission in the United States and final rulemaking regarding it is now being processed by the Canadian Radio-Television and Telecommunications Commission and decoders are not yet commercially available so it is too early to determine what impact teletext will have on the amount of captioning available

to deaf consumers, However it should be noted that three major North American networks have indicated their intention to use teletext for captioning--CBS, NBC and CBC.

Computer Adaptation

Computer technology has also been adapted for the deaf. Electronic mail and computer assisted communication has been experimented with for a number of years now in the United States beginning with the establishment in 1978 with a two year Federal Grant of a local service for the deaf in Boston by the Deaf Communications Institute using a Hermes software system. Stanford Research Institute (now SRI International) in 1979 was awarded an initial 15 month contract to set up two demonstration projects, one in Washington, D.C. and the other in San Francisco and these two were then linked with the Boston node. These experiments utilized a minicomputer (PDP/11 with Unix software) which proved to be too expensive and the demonstration project did not attract enough paying clients to justify its operation beyond the period of the later extended experiment when both the San Francisco and Washington demonstration nodes closed. The Deafnet/Boston system joined GTE Telemail and became national, providing a link for the officers of several national organizations of the deaf but it too did not prove to be economically feasible (perhaps because it depends upon the availability of ASCII terminals or dual mode terminals which are still not sufficiently widespread among deaf persons at this point) and has had to restructure its operations recently, entering a new phase which includes an educational experiment with linking a school in the United Kingdon and a school in Canada to schools in the Boston area.

An attempt to determine whether a Deafnet system would be feasible if a microcomputer rather than a minicomputer was used is underway now under another government grant to SRI International with an attempt to set up ten locally established and managed nodes (including Deafnet/Boston) which could eventually be linked to form a national system. These local networks would acquire their own hardware and do their own fundraising and administration but would receive software assistance and consultative assistance from SRI which includes software to accomodate access by both Baudot/Weitbrecht and ASCII/Bell 103 terminals, presently considered essential by some to attract sufficient users. An alternative would be to purchase low-end micro computers with modems in OEM quantities and then resell them to deaf users at cost.

Meanwhile in Washington D.C., a group of amateur radio operators with assistance from the Federal Government set up the Handicapped Educational Exchange (HEX) a number of years ago to serve as an electronic bulletin board in exchanging information regarding the disabled using a microcomputer. This was recently expanded to include multiple users and private mailboxes so it has become an electronic mail node for the deaf in Washington. Its feature, similar to the earlier SRI experiment is that it can be accessed by both Baudot and ASCII terminals. All three demonstrations have produced some excellent reports on their findings and the implications of the experiments.

Technological Advances

Technological advances are coming fast and there is always the danger that deaf persons will be left behind or hurt by new developments. There is also the opportunity to exploit new technology to improve the communication environment for deaf persons. We are now in the midst of an age of communication. The distinction between telephone, television and computer communication is becoming blurred and the three technologies are converging. As an example of this we now use computers not only to improve the captioning process of television but to make real time captioning possible and the captions can then be sent over packet switching networks for broadcast. Videotex which uses the telephone lines for communication has a microprocessor at each end of the line and generally uses a television set for display. More sophisticated communication workstations are generally microprocessors, with a modem which either hooks up to a television receiver or is built into the workstation. There is also a trend to building modular components. Thus the communication device of the future for deaf persons could be a single device or an integrated system of appropriate components (rather than many pieces of unrelated equipment as is presently the situation) which incorporates the functions of a closed captioning decoder for PBS System Line 21 or Teletext signals, a TDD terminal, an electronic mail system terminal, a personal computer, a home security and signalling system, a videotex terminal and a television receiver with split screen which would allow a deaf person to watch captioned television and use a computer or read telephone message at the same time. Hearing persons can presently listen to one device and watch another--in the future deaf persons will also be able to use two or more devices concurrently.

Cost Considerations

The price of personal computers has now come down to a mass market level and will soon be within the reach of most families. Price is a critical factor in the introduction of new technologies and the cost for deaf persons to obtain access to the telephone and television must be brought down to a mass market level also. The only hope of this happening is for deaf persons to hook into a system which serves the general public and can be mass produced without the need for expensive modification for use by deaf persons. Moving from the relatively isolated specialized TDD equipment into ASCII equipment and from specialized closed-captioning devices into general teletext system equipment which has incorporated caption reveal as an integral part of the equipment appears the best way to accomplish this. The deaf community, however, must provide, to a more significant degree, leadership in assuring that any new design of equipment or new applications of existing equipment incorporate the specialized needs of deaf persons. We cannot afford to continue to sit back and hope that new technology will help deaf persons--we must help to make it happen.

Canada is already doing something to make a transition to the mass market of teletext decoders in the area of television. It has developed a dual mode captioning workstation which will caption in either or both Line 21 mode or North American Broadcast Teletext Specifications mode, the system which has been adopted by CBS and NBC networks in the United States and the CBC network in Canada as the teletext standard they will use. Deaf people with either a current Line 21 decoder or a future Teletext decoder will be able to receive

captions because the captions will be inserted for both systems prior to broadcasting and there will be no need for any transcoding at the broadcast level, which is another possible solution to extending the usefulness of existing Line 21 decoders.

A device has already been developed and demonstrated which transcodes Line 21 signals into Teletext signals, by the proponents of the British developed Teletext standard but no equipment currently exists to pick up a Teletext signal and transcode it to a Line 21 system signal at either the broadcast or receiver end. Although this is much more technically difficult due to the differing transmission speeds (teletext is approximately ten times faster), and differing formats (teletext caption line holds more characters and captions can be placed anywhere on the screen while the line 21 system limits the captions to the top four and bottom four lines) it is still technically possible with a minimum loss of quality of the captions, especially if there can be some general agreement on initially designing teletext captions which limit themselves to common features for captioning purposes. Canada will sponsor a World Conference on Captioning in Ottawa in the late fall of this year and one of the major thrusts of this conference will be discussing the possibility of common standards throughout the world to facilitate exchanges of programs, research findings and technological advances.

The WGBH Caption Center has purchased dual mode equipment from the manufacturer, Norpak, a major Canadian developer of Telidon teletext systems and is utilizing it to caption several hours a week of closed captioned Teletext.

This new equipment also uses software which makes captioning more efficient and thus less costly. Even when transcoding is possible broadcasters may be very reluctant to go to the extra expense of adding and maintaining additional specialized equipment, a problem which is solved by the dual-mode equipment Canada has developed.

Closed captioning has two high cost factors--the cost of decoders and the cost of captioning itself. Both of these must come down before a true mass market can develop. The development of real time captioning has the potential of reducing the costs of captioning considerably and the new Canadian software does likewise. However, the cost is still far too high to enable captioning by broadcasters as a matter of course.

Electronic Interpreting

There are two current possibilities for electronic interpreting: a modified version of what was previously described as real-time captioning and second, through the use of optical scanning. Electronic interpreting is simply the display of captions on a television receiver without a background picture. A modified electronic stenotype machine was used by a deaf lawyer in 1982 in his appearance before the United States Supreme Court and other versions of such technology are under further development for educational uses at both the National Technical Institute for the Deaf in Rochester, N.Y. and Gallaudet College in Washington, D.C. Like real-time captioning, the speed and accuracy of the captions depends largely on the power of the computer, the sophistication of the disk dictionaries and the skill of the stenotypist. Since

all the current systems do is replace an interpreter with a stenotypist, the process remains labor intensive and thus currently offers no cost savings and, indeed with the need for equipment may even be more costly. However, the training of stenotypists can be more readily done than the training of interpreters and a number of research studies has shown that captions are preferred to interpreters for receiving information and are more accurate. The success of this type of electronic interpreting will probably rest with the development of voice recognition technology which is discussed later in the paper.

A second method could be to adapt the current electronic scanning devices which coupled with voice synthesis in a microcomputer are now being used by blind persons to read texts and papers. Instead of speech output, simple software could be written to reformat the text into readable captions. The speaker could then scan his text at the appropriate place and speed and captions would appear on either the personal hand held or desk receiver of a deaf person or on a strategically placed monitor. This method does not require the addition of a stenotypist and would add little cost beyond the initial investment in the microcomputer and associated software and in a classroom situtation could even utilize a time-shared mainframe. This could be especially useful in mainstream situations. Interpreters have done a tremendous job in making it possible for deaf persons to participate more widely in the mainstream of society but being both labor intensive (and thus costly) and in short supply have not been readily available. While electonic interpreting will never completely replace human interpreting, it could go a long way to further opening the mainstream of life to deaf persons.

Digital Television

Television, like telephone voice transmission, currently uses analog signals for transmission. Currently under development is digital television in which everything is concerted to digits for transmission. This will make it possible to store television pictures on computer disks and in the future a hook up between a personal computer and a television set will be quite common. Using digital television, captions could be completely independent of the signal transmission. Captions could be downloaded into a personal computer from some central data bank and later, under computer control, displayed at the appropriate time. One use for this would be for reception of captions in areas where the signal is not robust enough to produce clear captions. This would also make it possible to by-pass the possibility of caption signals being deleted by cable systems or local stations. This will also make it possible for persons to caption their own material at very little cost.

Voice Recognition/Voice Synthesis

New developments in technology hold great promise in reducing costs in television, telephone, and electronic interpreted communications. The most important is voice recognition. Command recognition, a subset of voice recognition with a very limited vocabulary, is now commercially available. Voice recognition is far more complex and uses vast amounts of memory which,

until recent years was very expensive. With the development of 64k chips and the coming commercialization of 256k chips, the question of hardware cost is now insignificant and the chief barrier to implementation rests largely with difficulty of developing software which handles the complexitities of the English language and the closeness of some sounds. Voice recognition developments are of critical importance to deaf persons and this is an area that should have vast amounts of Research and Development funds allocated to. Voice recognition when coupled with voice synthesis has tremendous power to become a communication equalizer for deaf persons making access to television, telephones and the computer virtually unlimited and has tremendous potential in developing the speech of deaf persons.

Voice recognition is the transfering of voice to digital signals which can then be transmitted and displayed on a visual medium such as a television set or a computer terminal. When developed, it would eliminate most, or all, of the human intervention in the captioning process and thus reduce the cost of captioning to little more than the acquisition and monitoring of captioning equipment. It would also spur a software market to utilize the computer to develop applications to produce multiple levels of language, multi-language translation, etc. With such a device most television program could be captioned at a very small cost and the current captioning centers could concentrate on research, development and certain marketing functions using normal government grants as their chief source of income. In electronic interpreting, the development of voice recognition will eliminate the need for human intevention between the speaker and the deaf receiver and will thus make it possible for schools and other public facilities to use electronic interpreting in most situation without the labor intensive cost of either an interpreter or stenotypist.

In speech training, it can be used to show deaf persons exactly what words they appear to be saying by displaying the actual words on a television screen as they are spoken. The deaf person can thus practice until the exact word intended appears on the screen. Stretching the imagination a little further, it could be used to pick up speech largely recognizeable only to the computer, translate the message into a digital signal then back through voice synthesis giving clearly recognizeable speach. With the trend to minaturization, perhaps it is not too far fetched to visualize such a device hanging from the neck (like a piece of fine jewelry) of a twenty-first century deaf person.

Voice recognition is actually divided into two distinct subcategories: speech-recognition which is determining what is being said and speaker-recognition which is determining who is speaking. Voice recognition can thus be either speaker-dependent in which case the computer would only understand a specific person whose voice pattern has been programmed into its memory banks or speaker-independent meaning that the computer would respond to anyone who talks to it. The only type of voice recognition equipment available commercially at the present time is speaker-dependent, using voice templates to recognize words. Voice templating means that each word must be read into memory so that a template is established which can then be compared with when the same person says the same word again. This obviously takes tremendous memory and is generally impractical when a large vocabulary must be involved. Currently technology is getting around this problem through the use of what is called feature-based

recognition which does little more than identify a word through its phonetic components. This technology, however, is still in the research and development stages and a long way from commercial availability and many of the problems associated with it have not yet even been considered. Noevertheless, many experts believe that one day in the future this is going to be a completely natural thing and it is up to the deaf community to push for earlier implementation. In the meantime a more practical solution of encouraging speaker-dependent voice recognition technology exists for exploitation.

Voice synthesis (or the transformation of digital signals into voice) is now very widespread and talking automobiles, refrigerators, clocks, etc. are all around us. Chips to acomplish this are readily available for personal computers. While this development threatens to add to the communication problems of deaf people, it also has great potential for telephone communications when combined with voice recognition. A deaf person could use his terminal to type a message which would then be converted into voice signals through voice synthesization and the hearing person would then speak into his regular telephone and the signal through voice recognition would then be converted into a digital display for the deaf person. This could make all telephone accessible to the deaf population and would make it unnecessary for hearing persons to purchase any additional equipment to communicate with deaf persons. Initially, the conversion of signals from one form to another could occur in central computer centers but eventually with the cost of memory coming down to a few dollars and software downloaded from the telephone company to the deaf persons communication station, it could be done directly from the deaf person's terminal.

Conclusion

While many of the concepts presented in this paper represent 'Utopia', a number of research labs including Bell Labs are working on them and with appropriate interest and pressure from the deaf community could accelerate such developments and share them with other countries around the world.

The author, an Associate Professor of Business Administration at Gallaudet College and President Emeritus of the Canadian Association of the Deaf, is Vice-Chairman of Visual Media Services of the United States National Association of the Deaf, Project Director of the Canadian Captioned Films and Telecommunications Program, Board Member of the Canadian Captioning Development Agency and of Deaf Communications Institute of Boston, Mass.

Attachment 2

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554

In the Matter of	)	
	)	
Amendment of Part 73	)	BC Docket No. 81-741
to Authorize the Transmission	)	RM-3727
of Teletext by T.V. Stations	)	RM-3876

COMMENTS IN SUPPORT OF RULEMAKING

The undersigned, a deaf consumer and consultant on electronic and telecommunication systems, hereby respectfully submits comments in response to the above captioned Notice of Proposed Rulemaking. The development of Teletext is of vital importance to the deaf community and almost half of the formal comments filed in the previous two proceedings touched on this aspect of Teletext. Reply Comments were previously filed in the proceedings related to RM-3727 by the author and the bulk of these comments apply also to this proceeding.

1. The Commission is to be commended for its decision to proceed with Rulemaking and not to go through what would be a stretched out Inquiry first. Teletext, indeed, offers opportunities for diversifying television service into new areas and for improving the efficiency of the spectrum usage. Teletext offers deaf persons not only the prospect of equal accessibility to its services but also the possibility of increasing the accessibility of regular programming through the use of closed captions at a potentially far smaller cost to the consumer than the present PBS Line 21 system does.

2. The Commission states "...we believe it is important to provide a regulatory environment that is conductive to the emergence and implementation of new technology". The decision of the Commission not to adopt a single standard seems incompatible with this stated goal. As the Notice itself points out, the majority of those filing comments in the previous related proceedings stressed the need for a single standard to get Teletext launched as a mass communications device. The Commission is urged to reverse itself on this point and to adopt either a single standard or a framework that would allow the operation of multiple design concepts.

3. The standard, if one is adopted, should be compatible with interactive videotex to allow the development of common components which would reduce the price needed to develop a mass market. Compatibility is important to deaf persons since a single system could then serve as their general communication system--functioning as a teletext unit, a telephone connected Telecommunication Device for the Deaf (TDD) as a substitute for a voice phone and as the interactive videotex (Viewdata) device in addition to being able to function as a standalone computer terminal. Interactive videotex, since it produces revenue from both Information Providers and users does not need a mass market to succeed whereas broadcast videotex (Teletext) with only revenue coming from Information Providers does. If the Commission wishes to realize its goal of creating an environment conductive to the emergence of Teletext, it must do all it can to assist the development. The requirement that all television receivers be capable of picking up UHF signals is an example of a strategy needed to assure the growth and continuance of such

stations and the adoption of a single standard for Teletext may likewise be required to assure its quick growth into a mass market device rather than an added service available largely to the affluent, commercial or specialized audiences. The adoption of a standard does not detract from the objective of the least government intervention in the affairs of business firms and consumers as the design, features, prices, etc. of the equipment which is produced for consumers based on these standards will be determined by the marketplace. Likewise by classifying Teletext as an unregulated service not subject to performance standards, the services offered utilizing equipment produced to conform to standards will also be determined by the marketplace. Allowing the marketplace to decide the standard even in the face of veiled threats that the regulations are subject to review if things do not turn out the way the Commission feels appropriate is an open invitation to corporate giants to use their muscle in quickly establishing defacto standards. The Commission states it would like to get out of the situation where it must make value judgments but evaluating whether the market is playing the way it should is a value judgment. In the fight to win acceptance as the standard, tremendous amounts of money will be expended (witness RCA's struggle to get its videdisc system accepted) and the increased cost is ultimately passed on to the consumer. The notion that deaf consumers (the vast majority currently unable to justify the purchase of a Telecaption decoder) would have to purchase two or even three decoders to obtain access to network programs is unacceptable.

4. The Commission has stated that under the proposal, section 73.682(a)(22), the current authorization for Line 21 captions, is redundant and should be replaced with the new authorization. This section, however, in subsection (a)(22)(b) states that at times when program related data signals are not being transmitted, other broadcast related signals may be sent, in effect giving priority to program related captions. The Commission is urged to include in the new regulations which replace the existing section (if such section needs to be deleted) that program related signals (with the exception of Visual Emergency messages already covered under new section 73.682(24)(iv)) are of highest priority and may not be deleted by either local broadcasters or cable systems. This protection for the curent PBS System Line 21 captions and any future program related Teletext Captions on Line 21 or other lines is necessary in the open market approach the Commission wants to pursue. This is surely a public interest objective (accessibility of deaf persons to the mainstream of broadcast services) which would be justified under current Commission philosophy of protecting such interests where the markets might not. The concept of captioning services, while growing, is not yet firmly entrenched and needs further time and opportunities to grow. The temptation to substitute non-revenue producing network produced caption signals with locally produced revenue-producing signals and on cable systems might prove too great to many broadcasters absent regulations to the contrary. The Commission stated in the Notice that it wanted to emphasize that it is not is intention to rescind authorization for the Line 21 system or to discourage in any way its use and such protection of program related signals would demonstrate this sensitivity to the needs of the deaf population.

5. The Commission has proposed that priority treatment be given visual emergency messages when there is a conflict between Teletext or the PBS System Captions. This is another indication of the Commissions sensitivity to the needs of the deaf population and is to be commended.

6. In addition to six other vertical blanking interval lines, the Commission is proposing the shared use of Line 21 for Teletext and the current PBS System captions. While this is apparently technically feasible, it introduces a number of concerns related to competition for the use of this line in the context of profit making capabilities of Teletext. It appears that the six other lines allocated to Teletext as the present far exceed the expectations of the developers of the various Teletext systems and with the prospect of adding 4 more lines (lines 10 through 13) in the near term future, are adequate for Teletext service and there is no need to share line 21 at the present time. If Teletext lives up to its promise, deaf people will switch to Teletext decoders in the future and as the number of Telecaption units in service decreases over their useful life, line 21 will also be freed up for Teletext use. If Teletext does not live up to its promise, the deaf community will still have the PBS System to fall back on so it should not be hindered at this stage of development. Deaf persons deprived of access to television for over 30 years, should not be expected to put their eggs all in one basket either for the PBS System or for Teletext and end up with nothing again. The Commission is thus urged to leave the existing Line 21 authorization as it is until a demonstrated need for it exists for other services. If the Commission insists on

sharing the line, at most it should be shared with Teletext program related captions and pages related to the deaf, to disabled or to other non-profit applications so there is no commercial competition for its utilization.

7. The Commission has sought comments on the impact of the proposal on broadcast services to the deaf population. There are a number of persons who believe that Teletext poses a threat to the survival of closed captioning. Two nationally distributed publications of the deaf have actually been led to believe and have reported that the Commission is considering the replacement of the present line 21 system with teletext services and have urged its readers to write the Chairman of the Commission regarding this alleged intention.

8. It may well be that the survival of closed captioning in the near to intermediate future lies in the opposite direction--that is it will depend upon the success of Teletext to survive. This statement is best explained by the following fact situation: Less than 50,000 decoders have been sold to date. If, on the average one out of every five decoders is turned on to a specific channel at any given time, this represents 10,000 units in operation. National Captioning Institute (NCI) research shows that roughly 3.5 persons watch together when the unit is in operation, giving 35,000 viewers. Since over half of these people would be watching (but presumably not understanding or enjoying as much) these programs anyway absent captions, this represents a net gain of less than 20,000 viewers for an expenditure of $2,200 per hour program. Given these hypothetical

figures (and you can other variables to adjust it up or down several thousand), broadcasters will eventually have to reassess their commitment of large sums to serve such a small additional audience. The solution, of course, is to increase the audience but NCI research shows that the primarly reason for low sales is the perceived high price (soon going up to $289 for an add-on decoder) and one method now being pursued to get increase sales is to have them donated to deaf persons. This simply increased the dependency of deaf persons on hearing persons and makes access to television by deaf persons a charitable cause rather than the right it should be.

9. Thus the only hope of reaching a large percentage of the hearing-impaired population which is estimated at 14 million by the NCI, absent the charitable cause route, is to bring down the cost to an amount that increases the cost of a Teletext equipped set to an increment of about $25 to $50 and to produce a wide range of receivers so equipped in a varied type and price range and the only hope for being able to do this is by finding a market to allow production in the hundreds of thousands rather than thousands which Teletext could do according to several estimates filed with the Commission in comments submitted to previous proceedings. A closed captioning service need not be PBS Line 21 System equipment dependent as many have been led to believe. If Teletext succeeds, it will vastly increase deaf audiences and may justify the expenditures of broadcasters for closed captioning and thus assure the survival of closed captioning. NCI can simply switch to Teletext encoders (since the captioning process up to this point is the same under any system) while providing a

phase-out transcoding service to existing Telecaption unit owners to assure those who have made investments to date in this equipment that it will continue to be useful for the duration of its expected equipment life. Teletext, with consoles and encoders more readily available, will also increase the number of sources of captioning--captioning could be done at the production rather than post-production level--and this would support the open market concept endorsed by the Commission.

10. As part of its regulations, the Commission should consider requiring broadcasters carrying program related captions in one format to transcode these captions to the other format. Transcoding from the slower and simpler PBS System to Teletext presents no problem and both the Telidon and CEEFAX proponents have stated they will develop such transcoding equipment but transcoding from Teletext to PBS System captions presents a number of problems due to faster bit rate, size, color, number of characters per line, etc. and although this will not give as pleasant an effect on Telecaption decoded transmissions, it is technically possible to do this at broadcast end.

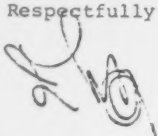
11. The Commission seeks comments on the application of Teletext to the deaf. Other comments, no doubt will cover this area. Reference can also be made the the Comments of WGBH Educational Foundation in RM-3727.

Summary

Teletext offers deaf persons tremendous potential. In addition to providing closed captions (and perhaps ultimately supporting the survival of this service), it provides deaf persons with

a service they now do not have: 'Visual Radio'. The Commission is urged to take speedy action to ensure that Teletext becomes a service reality in the near future.

Respectfully submitted



E. Marshall Nick
19 Bannington Drive
Largo, Md 20772

February 10, 1982

Attachment

Attachment 3

TELETEXT AND DEAF PEOPLE
A Look At the Issues and Concerns

A Report Prepared for
The National Center for Law and the Deaf

by

E. Marshall Wick

Summary

This report is being prepared to inform interested deaf persons and those working with them of developments related to a new technology, Teletext and of issues related to this development. The paper begins with a detailed summary of recent developments, describes in summary form the proposed Federal Communications Commission (FCC or the Commission) Rulemaking proposal on Teletext then lists and comments on seven selected issues and concerns. This paper may be used either for information purposes or to serve as a working basis for developing Comments to the Rulemaking process.

Background

A review in capsule form of recent Teletext related activities will assist in understanding the extent and breadth of what is going on in this technological development. Teletext itself, of course, is not new, having been under development in Europe (United Kingdom and France especially) at approximately the same time that PBS filed its petition to reserve Line 21 for closed captioning in 1975. (This system proposed and originally developed by PBS is hereinafter referred to as the PBS Line 21 system or the system using Telecaption decoders to distinguish this type of closed captioning from that which can be done on Teletext). This review is related to recent developments in making Teletext a reality in North America with special references to applications related to the deaf.

* July 29, 1980. CBS filed a petition with the FCC (RM-3727) requesting current use of lines 15 and 16 of the Vertical Blanking Interval (VBI), requesting that the United States standard for Teletext be based on the asynchronous (variable format) system called Antiope, developed by the French government.

Formal comments related to the deaf were filed by the National Captioning Institute (NCI), WGBH Educational Foundation and the author of this paper, E. Marshall Wick. Approximately half of the 24 papers submitted made some reference to the use of Teletext by the deaf. A summary of the comments filed can be found in the December 14, 1981 issue of the Federal Register beginning at page 60851. (46 FR 60851).

* March 26, 1981. The United Kingdom Teletext Industry Group filed a petition (RM-3876) for adoption of the British developed fixed format system (CEEFAX and ORACLE), also requesting lines 15 and 16 of the VBI. This put the two systems into direct competition with each other as the United States standard. Telidon, a system developed in Canada featuring superior graphics, also put the FCC on notice that they would be filing a petition for adoption of their system as the standard but due to later developments announced in May this never materialized. The United Kingdom (UK) group picked up the concept of transcoding Line 21 PBS system signals to Teletext signals at broadcast end as advanced by the author in his comments to RM-3727.

* March 26-27, 1981. The Canadian Association of the Deaf held its third closed International Conference on Television and the Deaf with representatives from all eight American and Canadian networks except NBC, government and other interested parties (including NCI, WGBH Caption Center, Gallaudet and NTID Television Centers) and approximately half a day was spent discussing Teletext related matters, including a report on the UK system (CEEFAX and ORACLE) application for the deaf. The British have the distinction of doing the first genuine 'real-time' closed captioning, doing President Reagan's inauguration speech. (NCI also captioned this speech in what they called 'real-time' but it was actually the broadcast of captions prepared in advance from a script from which the captions could not depart when the actual speech was made even though the President made some last minute changes--the British actually captioned as the President spoke without any advance preparation.) The British system for real-time captioning was originally based on a phonetically produced word using a Palantype system (like a computer assisted court reporting system) but they have refined this and shifted to a computer based system.

* April 8, 1981. KNXT (CBS) and CTSC-KCET (PBS) stations in Los Angeles began transmission of 'Extravision' and 'NOW!' Teletext signals respectively, experimenting with an Antiope based system. The WGBH Caption Center had entered into a contract with CBS to Teletext close-caption certain CBS programs (approximately 5 hours a week the smae as ABC and NBC on the PBS system at that time) and WGBH established a Los Angeles Branch on March 2, 1981. Sandy Thorn, a deaf captioner at the WGBH Caption Center (who had also taken an internship training stint in directing at the Gallaudet Television Center) was given a management level position at the Center. One of the Teletext decoders is at the California State University at Northridge, easily accessible to the CSUN Deafness Center students, personnel and community leaders. The WGBH Caption Center had been experimenting with an Antiope based system for over a year prior to this and had made numerous modifications to the system to make captioning both more effective and efficient and these changes have been incorporated into the basic software system which will operate the equipment proposed as the North American standard. These changes have also been documented and discussed in professional circles.

* May 13, 1981. WETA (PBS) Washington in conjunction with the Alternate Media Center of New York University began a market test transmission using the Canadian Telidon system. After considerable delay due to late equipment delivery, one of the 60 Teletext decoders was placed on the upper level of the Learning Center late in the Fall of 1981. This fact has not been publicized to date and is largely unknown to those who do not regularly use the Learning Center but the system is open to use by any interested party.

* May 15, 1981. NBC announced a Teletext test which would also be in Los Angeles (to take advantage of a shared computer facility).

* May 20, 1981. Westinghouse Broadcasting Company, Inc. (which had previously commissioned research from the NAD research arm on captioning) began a test of Teletext through station KPIX in San Francisco.

* May 20-22, 1981. Videotex '81, the first major North American Conference on Broadcast (Teletext) and Interactive (Viewdata) Videotex was held with over 75 speakers and over two thousand

registered participants from government, the broadcasting industry, cable systems, manufacturers, education and the legal field. This was held in Toronto. It is often referred to because of its extensive early commerical investment in Videotex as the Videotex capital of the world. The deaf were represented by Carole Osterer and Joe Blatt (Director and Producer respectively) of the WGBH Caption Center and E. Marshall Wick. The interpreter at the front of the plenary session room and the questions posed to the Panel of experts related to the use of Teletext for the deaf gave high visibility to the deaf to those involved with Teletext development. This conference was one of the mileposts in Teletext development as AT&T used this time to announce their Presentation Level Protocol (PLP) standard which, in effect, has become a de facto standard for the Interactive Videotex systems, bringing together both the Antiope and Telidon systems into a compatible new standard. It also made sure that broadcast and interactive videotex systems were compatible although the effect as the standard for the broadcast (Teletext) videotex is not as clear as it is for the interactive videotex.

* June 19, 1981. The Canadian Government's Department of Communications (the FCC equivalent for hardware standards in Canada) published BS-14 Broadcast Specifications (Provisional) for Television Broadcast Videotex in the Gazette (equivalent to the FR). These specifications are based on the AT&T PLP.

* July 21, 1981. CBS amended its petiton to the FCC (RM-3727) to accomodate changes based on the North American Broadcast Specifications which it published on June 22. In its amendment, CBS requested lines 17 and 18 additionally, on a permissive basis.

* October 22, 1981. The FCC at an open meeting voted 6-1 for an open environment (or deregulated) approach to Teletext standards, leaving the market place to decide what (and with which system or systems) to go for. Rulemaking was made flexible enough to allow commentors to ask for a specific system anyway. The Proposal was sent back to the staff for some rewriting. The Commission rejected a staff proposal (expected in the industry) for a combined Inquiry/ Notice.

* December 14, 1981. The Notice of Proposed Rulemaking BC Docket No. 81-741 was published in the Federal Register (46 FR 60851)

although the Notice itself had been released on November 27. Comment deadline was set at January 11, 1982 with Reply Comments due by February 10, 1982.

The Proposed Rulemaking would permit (but not allocate exclusively) the transmission on Lines 14,15,16,17,18,20 and 21 of Teletext signals. Line 21 would remain authorized for the PBS system captions on an equal access basis. The Commission specifically requested comments on the impact of the proposal on television service to the hearing impaired and information on the kinds of service that Teletext can provide for this segment of the population. The rulemaking states: ". . . we are not considering the elimination of the authorization for the existing captioning system ...".

* December 18, 1981. NCI filed a formal request for a thirty day extension of the Comment and Reply Comment deadlines to February 10, 1982 and March 12, 1982 respectively. ABC Network filed formal comments supporting this extension request on December 23, 1981. As of the start of this new year, the Commission has not acted on this request but other parties have indicated they support this request also and it is likely it will be granted.

Other Background Information

The following is an estimate of the number of Teletext decoders in operation around the world (excluding numerous experiments and trials) as gathered from trade press reports as of the end of November, all of them based on the UK fixed format system which is the only system being manufactured for commerical applications:

United Kingdom	225,000
Belgium	80,000
Sweden	40,000
Austria, Germany Holland	160,000

As a means of comparision, the number of Telecaption decoders in operation at the same time period is estimated at 41,000.

Field Enterprises also has a 100 unit Teletext system field trial going on on station WFLD in Chicago with 20 units in private homes and the rest in public locations. Their system is called Key-Fax and they have a unique Nite-Owl service where Teletext signals are broadcast in open format during off-hours. They have attracted an audience of 75,000 early morning hour viewers. WFLD uses the British system.

FCC Rulemaking: A Summary of BC Docket 81-741

In the Notice, Teletext is defined and it is proposed that it will be treated as an 'ancillary service.' This means users would not be required to follow any service guidelines or other performance standards and thus would not be subject to any content regulation or special reporting requirements. FCC control will remain in the sense that stations will be expected to utilize the system in a responsible manner and this will be a factor to be evaluated when license renewal applications are processed.

No single system is favored but the Commission recognizes that the market may well select a de facto standard which the FCC will permit provided the market was act freely in making its choice. The Commission proposes a provision that it may review the situation and add regulations if such prove necessary in the fture. The Notice clearly reflects the deregulation atmosphere curently existing in Washington with only Commissioner Wasburn dissenting with no reasoned elaboration of his dissent part of the record.

The Commission proposes only minimum technical standards, the chief concern being that the Teletext signals have no negative effect on the existing television signals (degradation). The number of VBI lines proposed, a total of 7 (4 for all stations, an additonal two for non-remote controlled stations plus shared use of line 21) came as a surprise to many in the industry--the more lines that are allocated, the faster access time to the pages will be or the more pages the system can have or a combination of the two. The greater capacity for the system will thus enhance its use and probably create greater demand. A hundred pages has normally been the upper limit for those systems undergoing field trials to date. Captions with the Antiope system only take one page as they are fed continuously into the VBI in much the same way that the PBS system cpations currently are.

Technical parameters covered by the Proposal are generally limited to which lines are to be allocated, the bit transmission rate (which can be up to ten times faster than the PBS system captions), transmitted pulse shape and the signal strength level (70 IRE units versus 50 IRE units for the PBS Line 21 system). These parameters are largely based on the CBS experiments with Teletext signals over the past few years at station KSL in St. Louis. In addition to immediate non-exclusive use of seven VBI lines, additional lines 10 to 13 are

proposed to be phased in between 1988 and 1991 as better television receivers replace older sets now in use which would be effected by the use of these lines at the present time.

The Issues Related to the Deaf Population

This paper addresses itself to seven issues of varying significance. A number of technical apsects such as signal strength, use of a reference pulse for a decoder-associated adaptive equalizer filter, pulse shape limited to nominal baseband, etc. do have relevance to a captioning service to the hearing impaired but are beyond the scope of this paper. The author also assumes that the deaf community is aware that opposing Teletext Rulemaking at this stage of its development would be a politically unwise and counter-productive losing cause. The deaf community should, instead, use this as a means to assure that what is developed is continues to be developed with services to the deaf in mind. As the author pointed out in his Reply Comments to RM-3727 (October 17, 1980, p.5): "If Teletext becomes a reality and incorporates captioning as an integral part of its standards, it will be the first time in history that a new communication device intended for use of the general population has provision for meeting the special needs of the deaf from the very start."

The seven selected issues and concerns are:

1. Whether the FCC should select general standards.
2. Whether Line 21 should be allocated for shared use.
3. Whether local stations or cable systems should be allowed to delete Teletext or other VBI signals and substitute their own.
4. What impact Teletext will have on Television services to the deaf.
5. What kinds of service Teletext can provide for the deaf.
6. Whether emergency signals should have priority over normal Teletext and PBS system captions.
7. Whether caption signals should be required to be transcoded (converted from PBS system captions to Teletext and vice versa).

On the following pages each of these issues and concerns is discussed separately. The comments are provided to give food for thought on each of the issues and concerns and are not intended to be all-comprehensive--a starting point for further development and not an end.

1. Whether Technical Standards Based on a Single System Should be Set.

The FCC rejected the petitions by CBS (RM-3727) and the United Kingdom Teletext Industry Group (RM-3876) and declined to take a position on which of the various systems (Antiope, Telidon, CEEFAX) or a hybrid of them to adopt, believing that they did not have the expertise to decide this and that the marketplace is the best forum to determine which system or systems should be used. Since Antiope and Telidon are now compatible under the North American Standard, the issue is narrowed to whether a variable format or fixed format would be best if any standard should be set. Originally it was believed that the BTS Subcommittee of the Electronic Industry Association would come out with a report late in 1981 in which it would announce which system the members of the Subcommittee supported as the standard but the EIA has still not released its study and the trade press reports that when it does release its findings, it will not recommend a specific system over another but simply give a detailed comparision. The FCC Notice in its analysis of Comments and Reply Comments to the CBS and UK Petitions acknowledges that 'We find that almost all of the commenting parties agree that teletext should be authorized and that the Commission should select a single technical system to serve as the standard for the United States'. While the Commission rejected the selection of a system it did state that the Rulemaking process was flexible enough to let the parties involved convince the Commission that its proposal was wrong if they felt strongly about standards. The first issue is whether the Commission should be urged to reconsider its position on whether a standard should be set or whether the market should be allowed to determine the systems to be used.

This is a difficult but important issue to be considered. There appear to be conflicting claims as to the effect of letting the market determine which system or systems to use. On one hand some analysts feel that by letting competition take place in an open market, system designers and manufacturers will strive to produce a better product at a lower cost and this benefits consumers without government intervention. The opposite argument which was largely present in Comments on RM-3727 (but curiously not commented on by manufacturers themselves) is that without a standard manufacturers will not invest in the development of a system which may not eventually find favor with consumers and thus will not put up sufficient risk captial to produce a low cost decoder

in the face of uncertainty. With the choice narrowed to the fixed format versus the variable format this argument may have less applicability today. Absent FCC system standards, the deaf community will have to hope that a defacto standard is set as it would be tragic to find one station using one system and another station in the same locality using another system incompatible with the other. Instead of making captions more accessible, this would require the purchase of still another device. Experts in the field feel that if the networks select a single system and begin using it, this will have a ripple down effect on the affiliate stations and the selection may become the defacto standard without FCC involvement which is the goal of deregulation. Also the growth of cable systems in the United States makes it possible to do head end transcoding so that several incoming signals could be converted to a single outgoing cable signal, also making FCC standards less needed.

Assuming the FCC is willing to change its mind and adopt a single system as standard, the next issue is which of the two systems--fixed or variable--to select. The Industry does recognize one very important aspect of Broadcast Videotex which is not necessarily present in Interactive Videotex and that is that to be successful you need a mass market and to get this mass market, you need to produce a low-cost decoder. The market is very price sensitive. Studies in the UK, where Teletext is moving but not yet into what we refer to as a mass market and where costs are still relatively high, show that most Teletext users come from the upper middle and higher class of persons much the same way that Telecaption decoders are largely purchased by more affluent and highly educated deaf persons. NCI's own research shows that 64% of those surveyed who did not have a Telecaption device did not have one because they felt the price was too high at $249 and a further 10% thoughtthe price would drop (it actually went up after the survey and will go up again early in 1982) and gave these as reasons for not buying a decoder. (Research Report 81-5, April, 1981). Thus the only hope for having closed captioning accessible on a mass market basis for the hearing impaired is to have the devices produced on a large scale basis for the rest of the population. Studies in England also show that the 5% of the population they classify as hearing impaired has purchased 15% of the Teletext units to date so the deaf can be considered as disproportionately higher users of Teletext in potential market projections and thus have a stake in the outcome.

Cost, however, involves more than the direct cost to the consumer of buying a decoder--it also involves the cost to produce the Teletext pages or, in the case of the deaf, the cost to produce captions for Teletext. With the British system, the decoder costs are apparently lower than the variable format decoders due to the fact that far less memory is involved with the fixed format decoders but the amount of difference in actual dollar amounts is a subject of dispute. It is clear, however, that within three years of production the add-on cost to a receiver to the manufacturer will be only a small fraction of the total cost of the receiver. In contrast, the cost and ability to produce a variety of captions appears lower for the variable format system but the amount also is in dispute. For the deaf to benefit, the cost of both the decoder units and the cost to produce captions must be low. A more complex issue is compatibility between broadcast and interactive videotex. The Commission has asked for comments on the relationship. For the deaf, compatibility may be more important than for the rest of the population because interactive videotex has the potential of serving as a TDD and computer terminal as well as a broad communication, business transaction and shopping tool and the deaf population may thus here too make up a disproportionately greater market force. The trade-off of a greater initial price (for a decoder) for the flexibility of compatibility may mean a greater value because a single console, while more expensive for single use only, could serve as an interactive videotex terminal, a teletext decoder and a TDD. The issue is whether the trade-off is desirable or not (if the FCC decides on a standard) in terms of reaching a mass market of deaf persons. A non-compatible decoder would be cheaper while a compatible device would be more useful.

2. Whether Line 21 Should Be Allocated for Shared Use

This issue will probably generate the most comments within the deaf community and will probably be misunderstood in spite of the Commission's taking special pains to stress twice in the Notice that it is not the Commission's intention to discourage the continuation of the present Line 21 system for those who wish to remain restricted to this for financial or other reasons. The present Line 21 rules will be redundant and will be replaced with new authorization to eliminate duplication in the text. The new authorization proposed to use line

21 on an equal access basis with closed captioning transmissions. Under the present rules 73.682(a)(22)(b) at times when Line 21 is not being used to transmit a program-related data signal, data signals which are not program related may be transmitted. When the FCC approved Line 21 for Closed Captioning (RM-2616, December 8, 1976) it did so on a non-exclusive basis. In their Report and Order, the Commission stated:

> 'Because of the many unanswered questions we believe that the proper approach at the present time is to permit the use of Line 21 for captioning but not reserving it for the exclusive use of such captioning. We are concerned that were we to reserve Line 21, at this time, we would possibly defer future technological developments such as a teletext-type system which would provide a larger number of services, including captioning, to a larger per-centage of the public.
>
> (Report and Order, Docket No. 20693, p 11)

Thus the Commission is not proposing anything startlingly new--those involved with the PBS Line 21 system have been on notice for a five year period. What is at issue is whether this allocation is necessary at this time given the fact that six other VBI lines are being made available. Sharing line 21 is apparently technically feasible even though the data transmission rates and formats are different. The PBS Caption System signals can apparently be interwoven with Teletext signals with the Telecaption equipment rejecting all signals which do not conform to its control codes. Thus from a technical viewpoint the present Telecaption users will be unaware that the line is being shared. The problem, if it indeed exists, may be in a perceived fear that broadcasters in an open environment free to use line 21 as they wish may opt to use Line 21 only for commercial teletext transmission instead of for captions, since the former are revenue producing and the latter represent a cost. This argument is considerably weakened when it is pointed out that captioning now is voluntary anyway and the present Rulemaking will not change that, and that captions using Teletext use only one page anyway leaving the vast majority of pages free for other use.

Three options are available on this issue:

1. Oppose the allocation of Line 21 on an equal access basis on the grounds that a seventh line for Teletext at this time is unnecessary and the present PBS Line 21 system needs more time to assure that captioning under any system will be done on a permanent basis.

2. Request that Line 21 be used only for closed captions of either the PBS System type or Teletext type plus pages which are deaf related. This will eliminate the fear that Line 21 would be used for commerical Teletext instead of captions and will assist in solving Issue No. 3 which follows regarding substituting Teletext signals.

3. Support the FCC proposal as it is on the grounds that a seventh line for Teletext will expand the capabilities of the system, allowing quicker access and/or expanded pages which will benefit the deaf as much, if not more (as more extensive users) than the rest of the population.

3. Whether Stations or Cable Systems Should Be Permitted to Delete Teletext Signals and/or Replace With Their Own.

A potentially far more serious situation for deaf persons than Issue No. 2 is the possibility that local stations and cable systems wishing to capitalize on the revenue producing capabilities of Teletext could (absent a rule) delete the incoming signals and replace them with their own. If Line 21 were on a shared basis and deregulated, local stations might delete all signals including the PBS System Telecaption signals thus depriving deaf persons in certain localities of all captions. Part of the Rulemaking should thus cover the prohibition of deleting program-related signals. This is certainly one of the most important issues of the present proceedings from the standpoint of continued service to the deaf.

4. What Impact Teletext Will Have on Television Services to the Deaf

This issue should be analyzed in terms of the greatly expanded potential of Teletext in addition to the benefits which are obvious in closed captioning which can be done on Teletext in a superior manner (Telidon can do animated captions as an example). One possible benefit, for example, is that encoding hardware will be readily available for Teletext, making possible the captioning of programs, announcements, commericals, etc. at source, one of the original goals of the developers of the PBS Close Captioning System. As a further example, Teletext could also make it possible for organizations of the deaf to become Information Providers and this will provide them with a new means of reaching members and potential members at the local and state levels. National organizations could also work out agreements with the networks

to carry a deaf magazine such as the have in the United Kingdom. (A magazine is a group of related pages on a single subject or classification). This would enable deaf persons not only to reach other deaf persons but the general population as well to inform them of deaf related concerns and events. The NCI 'PLUS' service has clearly demonstrated the potential of Teletext and has also shown the Telecaption Text limitations in that you must wait until the part of the text you are seeking rolls around again during which time you must scan otherwise unwanted data while with Teletext you can almost instanteously call up the wanted data through keying the page number on the control pad.

5. What Kinds of Service Teletext Can Provide Deaf Persons

The potential of Teletext is tremendous. In analyzing this aspect, thought should go much beyond the usual services of news, weather, sports, road bulletins, travel tips, entertainment information, airline shcedules, want ads and closed captioning into areas such as public information dissemination on deafness, organizational networking, and other creative uses. In education, for example one page can hold questions another page the answers, several language levels can be accomodated each on a separate page, etc.

6. Visual Emergency Priority

Section 73.635 of the Commission Rules (see 63 F 2d 388) gives priority over closed captions to visual emergency warnings (National Emergency, hurricane warnings, etc.). The proposal calls for retaining such a priority over Teletext and Line 21 captions in a new section which will replace the above section. This new section will be 73.682 (24)(iv). The deaf community should indicate their position on this requirement--whether it should be retained, expanded or eliminated.

7. Caption Signal Transcoding

In RM-3727, the author suggested that technology in the form of simple microprocessors and related software exist to transcode or convert a PBS System caption signal to a Teletext signal and vice versa so that although it is impossible to make the two systems compatible neither needed be deprived of the services of the other

and that while Teletext will make Telecaption units techrologically obsolete in terms of what will be possible at the same decoder cost or lower cost, the present Telecaption units could remain useful until they can be phased out over their useful life. In RM-3876, the United Kingdom Industry Group picked up half of this concept and reported that they embraced the concept of converting Line 21 signals to Teletext signals and acknowledged the existence of hardware to do so. However they did not comment on the reverse which is much harder to do--convert Teletext captions to Line 21. This is probably partly because the slow PBS Captions are easy to pick up and transcode in real time but the fast Teletext signals present a far greater problem. Regardless of the difficulty, it is technically possible to do this and the question is whether this should be a part of the Rulemaking or whether it should be left to organizations of the deaf to work out through the NCI and broadcasters. In view of the deregulation atmosphere and the fact that the Commission has declined at this point to select a single system, this could perhaps better be resolved through non-government means. The NCI, for example, may wish to protect the investment of those committed to the PBS system it embraces and may wish to develop and provide the networks with the appropriate equipment. However, groups which may press for adoption of a single standard could incorporate transcoding into the proposal.

January 4, 1982

Mr. WALGREN. Thank you very much, Mr. Wick, we certainly appreciate that—that testimony.

And at this point there is a vote on the floor that we have to respond to. We will be able to resume in about 10 minutes after 12. So we will take about a 15-minute break here and then we will finish with the other panelists.

I apologize for that but there's no way around it. Thank you.

[Recess.]

Mr. DYMALLY [presiding]. Ms. Isaacson?

We apologize for the delay. We had two votes instead of one. And now we will proceed with the hearings.

Ms. ISAACSON. Thank you, Mr. Chairman.

I am Shelley Isaacson, the director of Electronic Text Services of WGBH.

In the interest of time, I will attempt to paraphrase our written testimony which you have before you.

Thank you for this opportunity to talk about television access for 16 million deaf and hearing impaired Americans who have limited access to information.

Television is America's most pervasive information medium. For those suffering the isolation imposed by hearing impairment, television access is a frustrating and important issue.

The history of television access for deaf and hearing impaired viewers doesn't begin until 1972, nearly a quarter of a century after the introduction of television to American audiences. By that time, television had penetrated 96 percent of all American households. The WGBH Caption Center was formed 11 years ago as a department within the WGBH Educational Foundation, Boston's public television station.

In 1972, the Caption Center, with Federal support, captioned the first broadcast program aired with captions, the French Chef with Julia Child, on PBS. The captions were open, that is, visible on all television sets. Thereafter, the Caption Center embarked on a 9-year nightly rebroadcast of the ABC Evening News with open captions. More than 200 PBS stations carried the program, which was produced with Federal funding and the cooperation of ABC.

Although open captions made television accessible to millions of deaf and hearing-impaired viewers, the captions were distracting to hearing viewers and interfered with production values. As a result, only a limited number of PBS programs were available with open captions between 1972 and 1980.

In response, PBS engineers, with the assistance of the WGBH Caption Center and Federal funds, developed the system of closed captioning which displayed captions only on television sets attached to special decoders.

In 1980, the line 21 closed captioning system was introduced to the marketplace and the National Captioning Institute was formed to promote its availability and use. Unfortunately, projections of 100,000 line 21 decoder sales per year proved to be unrealistic.

In the 3½ years the decoders have been available, a reported 70,000 have been sold according to NCI figures. Assuming 2.5 hearing-impaired viewers per decoder, that means 180,000 potential viewers for line 21 closed caption programs, only 4 percent of the almost 5 million hearing-impaired viewers who most benefit from

captioning and a mere 1 percent of the total 16 million who suffer some degree of hearing impairment.

The low volume of decoder sales has been attributed to a number of factors, including the relatively small volume of caption programing available, the cost of the decoder, and the unwillingness to admit to a need for a special adaptive device.

Despite the significant financial contributions of ABC, PBS, and the U.S. Department of Education, despite the marketing efforts of NCI and the WGBH Caption Center, and a corresponding increase in the amount of closed caption programing available, decoder sales have declined in volume over the last 3½ years. Thirty thousand were sold in 1980, 18,000 in 1981, 12,000 in 1982, and 10,000 in 1983.

NBC has discontinued its financial support of closed captioning and CBS continues to decline to carry line 21 closed captions.

At present levels, captioning is a very tough sell and television access is a reality for a very small portion of the potential audience. The degree to which television is accessible is largely determined by four factors. One, the technology—what's available, and what equipment is required.

Two, the services—what captioning and other services are available.

Three, the consumers. Who has access and at what cost?

And, four, the marketplace. What are the costs and who is going to pay?

It is the potential to address those factors more effectively that inspired WGBH Caption Center to investigate teletext.

In 1980, the Caption Center was invited by CBS to participate in the development of closed caption systems for teletext. Teletext was developing in other countries with closed captioning as an integral component of a broad range of information services.

It should be noted that the United States and Canada are the only countries where captioning is a separate data service requiring deaf people to buy special adaptors. Canada is now eliminating that practice by incorporating captioning into its teletext services.

For the last 3 years, the WGBH Caption Center has produced closed captions in teletext format for CBS prime time programing and in line 21 format for a number of other network programs.

WGBH has conducted its own demonstration of teletext public service and educational implications with two locally broadcast information services. We have also produced teletext pages specifically targeted at deaf and hearing-impaired viewers for CBS's Extravision. Having had firsthand experience with open captions, line 21 captions, and teletext captions and information services, we are convinced that teletext offers superior captioning capability and an unprecedented opportunity via its other information services to bring deaf and hearing-impaired people into the mainstream of our society.

We have in our written testimony detailed the advantages of teletext and its specific technological service, marketplace and consumer implications. Letters from consumers and professionals who have used teletext are also attached.

In brief, teletext offers a more versatile captioning capability than other systems. A variety of type faces, type sizes, caption

placement options, colors, and graphics can be used to differentiate speakers, indicate sound effects, and narration.

Teletext high data transmission rate allows precise synchronization with video and reduces the lag of real-time captioning. Teletext captioning has no noticeable effect on the speed with which other text services may be accessed. Of particular importance to broadcasters, teletext captioning requires only a tiny portion of the vertical blanking interval's capacity, thus allowing captioning to be integrated flexibly with other services using the same line or lines.

In addition to the technological advantages, teletext mass market information services will give deaf and hearing-impaired viewers true equal access to a myriad of timely information—news, weather, sports, announcements, and more—all in purely visual text and graphics will be available at the viewer's discretion and control.

For the first time, deaf and hearing-impaired people will have access to a broad range of short-lived or timely information at the same time it reaches hearing viewers.

Teletext marketplace and consumer advantages derive from the perception of teletext as a broad, mass market audience service. As with other electronic products, it can be assumed that the cost of decoders will decline as they are produced in volume and may eventually be built into all television sets.

If captioning capability is a standard feature of teletext services, deaf and hearing-impaired viewers will be able to access captioning on the same decoder purchased by everyone else, thus eliminating the need for a special adaptive device and enabling deaf and hearing-impaired viewers to watch captioned programing on any set equipped for teletext.

Finally, as teletext decoders penetrate the market, the potential audience of deaf and hearing-impaired viewers will increase significantly and private sector sponsors of captioning will be more easily persuaded that captioning dollars are well spent.

Despite the promise of teletext, there are problems, to be sure. Teletext decoders are not yet available in the marketplace. Equipment standards were not determined by the FCC in its March 1983 ruling. And cable systems may or may not carry teletext services as the result of the FCC's failure to extend must carry to broadcast teletext.

The Caption Center is sometimes perceived as a supporter of teletext and an opponent of line 21. The fact is that our overriding mission is to make television accessible to hearing-impaired viewers through captioning and other text services whatever technology exists.

Line 21 is here now, an operational and dependable system for delivering captions to some viewers. Teletext is on the horizon and offers the ability to provide captions plus a whole range of information and services to nonhearing as well as to hearing viewers.

Although we continue to regard line 21 as the best currently available system and applaud the efforts of all those involved in its development and support, we view teletext as a more effective mainstream communications opportunity.

We are concerned that this opportunity be exploited at the outset of teletext development. Too often the benefits of new technologies for the handicapped are ignored or merely afterthought.

First, we would recommend that public attention be directed to an evaluation of teletext and a strategy for increased television access that protects deaf and hearing impaired consumers.

Second, we are recommending that captioning capability be built into teletext production, transmission, and decoding equipment at the outset, and protected from potential competing claims on vertical blanking interval space.

The obvious first steps are to mandate inclusion of a captioning button on all teletext decoders; to encourage the exploration of teletext by captioning agencies; to oblige broadcasters and cablecasters to regard captioning as part of the copyrighted video program; and to reserve a place for captioning in teletext systems regardless of its physical placement in the vertical blanking interval.

In closing, WGBH respectfully requests that all concerned parties carefully examine the potential of teletext for deaf and hearing-impaired viewers. Failure to exploit this opportunity could result in competing and exclusionary pressures for the usage of the vertical blanking interval; perhaps resulting in the loss of line 21 to other uses without a guaranteed place for captioning and teletext services.

As teletext technology develops, we must take full advantage of its potential to expand and improve upon accessed television for hearing impaired consumers. It makes no sense to permit such a promising technology to develop without insuring its full capacity to serve our audience.

We are not advocating the immediate dismantling of the line 21 system, but, rather, a cooperative effort to protect the future as well as the present through the investigation of transitional technology. Informed support and exploration of new technological opportunities are required if those technologies are to serve the public interest.

Hearing impaired people should be guaranteed a place in the electronic mainstream regardless of the way in which communications technologies develop.

Mr. DYMALLY. Thank you very much.

[The prepared statement of Ms. Isaacson follows:]

Submitted for the record to
the Subcommittee on Science, Research and Technology
U.S. House of Representatives
November 9, 1983

- ADDITIONAL STATEMENT OF SHELLEY R. ISAACSON
- A TECHNOLOGICAL COMPARISON
- QUESTIONS AND ANSWERS ABOUT CAPTIONING
- CAPTION CENTER CHRONOLOGY
- LETTERS OF TESTIMONY

The WGBH Caption Center, WGBH Educational Foundation
125 Western Avenue, Boston, MA 02134

Additional Statement
of
Shelley R. Isaacson
Director of Electronic Text Services
WGBH Educational Foundation

before the
Subcommittee on Science, Research and Technology
Committee on Science and Technology
U.S. House of Representatives

November 9, 1983

INTRODUCTION: The WGBH Educational Foundation is a community licensee of public television and radio in Boston, Massachusetts. The WGBH Caption Center, a department within the WGBH Educational Foundation, is committed to television accessibility for deaf and hearing-impaired viewers through caption-production services and the development of increasingly effective and efficient captioning systems.

BACKGROUND: In 1972, more than a quarter century after the mass introduction of broadcast television to the American audience, WGBH produced the first captioned programs to be broadcast in the U.S., The French Chef with Julia Child, which aired on PBS. That effort was sponsored by the U.S. government. Finally, deaf and hearing-impaired viewers began to have limited access to this country's most pervasive communications medium.

But surveys of deaf and hearing-impaired Americans have consistently shown news to be the most sought-after television programming. At that time the only technology available was a process called open captioning, through which captions are placed on a videotape like subtitles and are seen by all television viewers. Using that process, the Caption Center increased its efficiency to a point where it became possible to videotape a national evening news broadcast at 6:30 pm, prepare captions, and rebroadcast the captioned program at 11:00 pm on PBS with special features in place of commercials. THE CAPTIONED ABC NEWS became the first national news program available to deaf and hearing-impaired viewers and was carried nightly on more than 200 public television stations.

Although open captioning addressed the issue of accessibility for the nation's deaf and hearing-impaired community, the growth of captioning was hindered by a concern that subtitles distract many hearing viewers and sometimes interfere with a program's production values. In response to that concern, the WGBH Caption Center lent its assistance to PBS engineers in the development of line-21 closed captioning. Employing techniques which "hide" a digital stream of captions in a previously unused portion of the television signal (the Vertical Blanking Interval or VBI), PBS developed a system which allows captioning to be broadcast with a television program and displayed only on sets equipped with special decoders.

In 1980, with government funding and key personnel from PBS and WGBH, the National Captioning Institute (NCI) was established as the exclusive licensee

of this PBS-developed technology to provide America's line-21 captioning service. Prevented by NCI's license from obtaining access to the PBS diskette-storage format (whereby time-coded caption files are transferred from the caption-production agency to broadcasters and videotape laboratories), WGBH developed its own line-21 captioning system. The WGBH Caption Center now provides 3-5 hours per week of captioned WGBH programming on videotape to PBS, 30-50 closed-captioned commercial spots per month to national advertisers, and broadcast and educational programming to other clients.

According to the latest NCI figures, 72,000 line-21 decoders have been sold to deaf and hearing-impaired viewers, who currently receive approximately 40 hours of captioned programming per week with captions prepared by the WGBH Caption Center and NCI. Scrolling text services are also available. With the support of the federal government, news and certain network movies are accessible via captioning from NCI. ABC and television advertisers are also funding the captioning of prime-time programming and commercial messages. And thanks to PBS and the fund-raising efforts of WGBH, many hours of public television programming are closed captioned as well. Both NCI and the WGBH Caption Center devote considerable resources to persuading program producers and sponsors to caption their programs. And WGBH has adopted a station policy requiring that underwriting for all national programming produced at WGBH include funds for captioning.

Marketing of line-21 captioning has been an uphill battle in an industry where audience numbers remain the driving force. While the government is still the single largest and most supportive funder, the private sector has growing concerns. Advertisers find it difficult to justify the expense of captioning for a relatively small potential audience. NBC has discontinued its financial support of closed captioning. CBS has declined to carry line-21 closed captioning in favor of development of teletext closed captioning.

The sale of only 72,000 decoders over a 3 1/2 year period (NCI's figures) to a potential audience of 16 million deaf and hearing-impaired viewers in this country has been a major disappointment. Original projections had anticipated sales of 100,000 per year, but NCI now projects sales of only 1,000 per month. Low sales have been attributed to a number of factors, including the relatively small volume of captioned programming available, the cost of the decoder, and an unwillingness on the part of potential users to admit that a special adaptive device is needed.

Although the federal government has been generous in its support of captioning, large increases in caption funding cannot be expected. At up to $2500 per program hour, captioning costs are not insignificant. The presence of two captioning agencies in the U.S., both dedicated to development of more efficient captioning systems, has kept those costs under control; but they, too, are stymied by a relatively low volume of captioning work.

In 1980, WGBH was invited by CBS to participate in the development of teletext closed-captioning systems. Recognizing the potential of teletext to deliver closed captioning as only one of its many visual information services, and persuaded that the broad audience economics of teletext might mean lower-cost

decoders and larger audiences for closed captioning, we eagerly accepted that invitation.

TELETEXT AND HEARING-IMPAIRED PEOPLE: The marketing implications of including captioning in a general-audience broadcast information service are compelling. If teletext becomes a marketplace reality, teletext decoders will be in demand by a broad segment of the American viewing audience. If there is a button on teletext decoder keypads labelled "captioning," deaf and hearing-impaired viewers will have access to closed-captioned programs and a range of up-to-the-minute information services without having to purchase any special adaptive devices. Further, if teletext decoders become widespread, hearing-impaired people stand a greater chance of having access to TV when they are away from home. As with other electronic products, it has generally been assumed that, as teletext decoders become available in large numbers, the cost per unit will decline, eventually settling at a cost of $50-$150. Furthermore, as deaf and hearing-impaired viewers with access to teletext increase in number, the private-sector sponsors of captioning will be more easily persuaded that captioning dollars are well spent, and more captioned programs will become available.

As an information medium, teletext can help bring deaf viewers into the mainstream of society. For the first time, teletext will bring to deaf people--who have no access to radio and extremely limited access to telephones--information which has always been taken for granted by hearing people. Page selection and reading time are at the viewer's discretion. There is almost no limit to the type of information which can become available on teletext. Deaf people can even become their own service providers, with organizations using teletext as a means of sharing information through a special-interest section of a teletext magazine.

In brief, teletext information services promise these important advantages to hearing-impaired viewers:

NO SOUNDTRACK: Teletext is a purely visual system; this makes it especially well suited to hearing-impaired viewers.

NO SCROLLING EFFECT: The print information remains on the TV screen until the viewer decides to change it. This has special benefit for people who need extra time to read, perhaps because of poor eyesight or limited reading skills.

NO WAITING: Information is available within seconds at the command of the viewer. There is no need to wait for a scheduled broadcast.

ELECTRONICALLY UPDATED INFORMATION: Because teletext is electronically delivered, it can provide continual updates on each page of information. Alert messages can be flashed on the regular video picture to signal an important text bulletin or update.

As a captioning medium, teletext has several advantages over the current line-21 closed-captioning system:

PLACEMENT: The captioning agency can place teletext captions anywhere on the TV screen. This allows for clearer indication as to who is speaking, and important parts of the picture can remain unobscured.

VISUAL CHARACTERISTICS: Teletext captions may be in any of thousands of colors, with or without background masks, in a variety of type styles and sizes. This is also extremely useful in indicating clearly who is speaking and in differentiating between actors' dialogue, narration and sound effects.

GRAPHICS: Colorful symbols may be added to teletext captioning for greater comprehension of sound effects. This is especially important in increasing the visual appeal of children's captioning.

HIGH DATA RATE: Because teletext is transmitted at the rate of thousands of characters per second, the lag of "real-time" stenographic captioning is significantly reduced, and there is more accurate synchronization of captions with video.

Finally, the use of teletext for services to deaf and hearing-impaired viewers offers important advantages to broadcasters whose support of captioning and other services is critical. Closed captioning can be included in a teletext data stream without devoting an entire line of the VBI and without significant impact on transmission of other information services. As claims on VBI space grow, teletext makes it possible to transmit captions compatibly with other services on a part of a line or lines. Line 21 is protected for captioning until 1988. Integration of captioning with other teletext services would increase the broadcaster's flexibility in the use of what may be a valuable and scarce resource. If teletext closed captioning is protected in the same way as line 21, the broadcaster can make the decision as to placement in the VBI.

Development of teletext services has escalated in the last two years to a point where two commercial networks are making major investments, set manufacturers have begun to consider wide-scale manufacture of decoders, and equipment manufacturers are building production and transmission equipment. In March of this year, the long-awaited FCC ruling was issued and teletext was given the go-ahead. Broadcasters, following the color televison model, have been expected to create a demand for decoders by airing national services. Both NBC and CBS have accepted that challenge.

There are problems to be sure. Consumer decoders are not yet available on the market, and they will be delayed further by the FCC's failure to set a standard for equipment or to impose a must-carry provision for cable systems. But development work continues and a de facto standard has been endorsed by two major networks, AT&T and ANSI.

A detailed comparison of line-21 and teletext services is available in the appendix, as are letters from representatives of the deaf and hearing-impaired population regarding teletext.

THE WGBH TELETEXT EXPERIENCE: Over the last two years, the WGBH Caption Center has captioned 3-5 hours per week of CBS prime-time programming in teletext closed-captioned format and worked on the development of NABTS captioning systems. This experience has convinced us of the superior ability of this technology to deliver closed captioning, and we continue to work with equipment manufacturers and the networks to improve teletext captioning systems.

We have also worked with manufacturers on development of dual-mode captioning equipment which simultaneously produces line-21 and NABTS teletext captions. We are aware that NCI has also done some work in the area of transcoding captions from line 21 to teletext. Transcoding allows viewers to see line-21 captions on a teletext decoder. But with line-21 technical specifications as the governing standard, transcoding does not permit teletext captioning or information services to be viewed on a line-21 decoder.

Dual-mode captioning produces captions in both line-21 and teletext format so that captions appear on a line-21 decoder in line-21 format and on a teletext decoder in teletext format with all the additional features teletext offers.

This fall we are delivering to PBS the first dual-mode captioned programs in the United States using a system that simultaneously transmits line-21 and teletext closed captioning according to the North American Broadcast Teletext Specification (NABTS). NABTS is the teletext standard endorsed by CBS, NBC, Canadian broadcasters, and the majority of cable teletext systems. We are of the opinion that dual-mode captioning is a logical first step toward protecting hearing-impaired people in this era of rapid technological change.

As a broadcaster, WGBH has also had considerable experience with teletext information services. In August of 1982, 20 teletext decoders were placed by WGBH in public high schools and other public locations in the Greater Boston area. For nine months, WGBH produced a 100-page educational news service targeted for public high school students in an attempt to assess the public-service and educational implications of teletext. That experience suggested that teletext is an attractive and compelling delivery system with promising implications for improvement of reading and writing skills as well as current-events education.

In December of 1983, WGBH will begin airing a second public-service teletext demonstration. Decoders will be placed in Massachusetts Division of Employment Security offices and will access job-market facts, employment planning information, job listings and employment service offerings.

WGBH has also been preparing pages for the CBS Extravision service specifically targeted for deaf and hearing-impaired viewers. News summaries, a bulletin board and public-service announcements are prepared and updated regularly.

All of these experiences with teletext's information-delivery capability suggest to us the strong potential for teletext to provide free and continuous access to a wide range of special-interest and general audiences.

SUMMARY AND RECOMMENDATIONS: Emerging digital technologies now hold out a promise to help overcome many communications barriers for sensory-deprived people, and at comparatively low cost. Tactile and oversize visual displays, special motor aids, and television captioning are some of the obvious ways of connecting millions more people to their electronic environments. Government and industry must encourage new communications technologies like teletext which have the potential to increase access for those with sensory or other impairments. Such highly specialized services need public coordination and support if they are to be implemented in the private sector and if the handicapped population is to benefit from society's technological advances.

If consumer teletext becomes as successful in the United States as in other countries, digitally transmitted text will be common on American TV screens. Canada, Great Britain, France and other countries have already integrated closed captioning into their national teletext services, eliminating any need for a special "deaf" adapter. At very little extra cost to the industry, American teletext can have a similar mainstreaming effect.

WGBH views as part of its mission the monitoring of new technologies which might result in more efficient and effective captioning systems. We are advocating inclusion of captioning capability at the outset of development of those systems.

Although we applaud the efforts of all those who have developed and promoted the line-21 system, we recognize the opportunity in teletext to address several issues which have hindered line-21 penetration. Failure to exploit this opportunity could result in competing and exclusionary pressures for the usage of the vertical blanking interval, perhaps resulting in the loss of line 21 to other uses without a guaranteed place for captioning in teletext services. As teletext technology develops, we must take full advantage of its potential to expand and improve upon access to television for hearing-impaired consumers. It makes no sense to permit such a promising technology to develop without ensuring its full capacity to serve our audience. Efforts to adapt original line-21 captioning to teletext format are limiting and inefficient, and they do not permit access to other information services which teletext pages can provide.

In 1972, a quarter century after the mass introduction of television to American audiences, WGBH produced the first open-captioned broadcast programs. Nine years later, closed captioning was introduced. Now comes teletext, bringing with it a potential to serve more hearing-impaired viewers and to make more of the television medium accessible than ever before.

WGBH remains committed to line-21 closed captioning as the best delivery mechanism available right now, but we request that all parties encourage teletext to make good its promise to the 16 million deaf and hearing-impaired citizens of this country. We are not advocating the dismantling of the line-21 system, but rather a cooperative effort to protect the future as well as the present. Informed support and exploration of new technological opportunities are required if those technologies are to serve the public interest.

We would suggest that public attention be directed toward the following:

1. Protection of line-21 consumers

Any move toward implementation of teletext closed captioning should acknowledge and address the valuable contribution of line 21 and should not jeopardize the services delivered by line 21. Dual-mode captioning protects those consumers who have invested in line-21 decoders while providing for coordination of emerging technologies with existing ones. Although the WGBH Caption Center has spent considerable time and effort on the development of that capability, the implementation of dual-mode captioning requires the cooperation and support of many crucial players--networks, broadcasters, equipment suppliers, producers of captioning and public agencies.

2. Continuing surveillance of the development of teletext and protection of teletext's potential to deliver captioning and other informational services.

Captioning capability should be built into teletext production, transmission, and receiving equipment at the outset and protected from competing claims on vertical blanking interval space. At the present time, some teletext decoders access captioning awkwardly, if at all. Some television networks cannot pass teletext captioning, cable operators may have the right to remove teletext captioning from broadcasters' signals, and line 21 has been reserved for closed captioning only through 1988.

The obvious first steps are to mandate the inclusion of a "captioning" button on all teletext decoders, encourage the exploration of teletext by captioning agencies, oblige broadcasters and cablecasters to regard all captioning as part of the copyrighted video program, and reserve a place for captioning in teletext systems.

WGBH respectfully recommends that all concerned parties--networks, broadcasters, equipment manufacturers, captioning agencies and government--carefully examine the costs and benefits of teletext captioning. The Canadian federal government has already invested or committed nearly a half-million dollars for the development of dual-mode captioning, and this valuable service will soon be a reality for thousands of hearing-impaired Canadians. In the United States, television VBI's are being committed to profitable data-distribution services, while proponents of line-21-only captioning maintain that consumer teletext is of no immediate value to hearing-impaired people. If we act now, hearing-impaired people should be guaranteed a place in the electronic mainstream regardless of which way communications technologies develop.

THE LINE-21 AND TELETEXT SYSTEMS: A COMPARISON

LINE 21	TELETEXT
HISTORICAL OVERVIEW	
The line-21 system was developed during the 1970's by PBS in cooperation with WGBH and with the encouragement and support of the U.S. government, particularly Dr. Malcolm Norwood. In 1980, the National Captioning Institute was established with personnel from PBS and WGBH, and with government funding, to provide a national line-21 closed-captioning service. Today, the line-21 system is used by NCI and WGBH to provide closed captioning for about 40 program hours per week on PBS, ABC, NBC, and cable systems.	In other countries, captioning is an integrated component of teletext services; no special or separate systems are required. Teletext closed captioning has been pioneered in the United States by CBS in cooperation with WGBH. Today, three hours of programming per week are being broadcast nationwide by CBS with teletext captioning provided by WGBH.
DECODER AVAILABLITY	
TeleCaption adapters may be purchased or ordered from Sears for less than $300. Major deaf organizations and the National Captioning Institute also market TeleCaption adapters and integrated TeleCaption TV sets, at reduced prices. Some cable operators offer line-21 decoders for monthly lease.	Consumer NABTS teletext decoders are not now available. Sony, GE, Panasonic and other manufacturers have announced first-run consumer decoders for the NABTS standard (the teletext standard endorsed by CBS, NBC, Canadian broadcasters, and many U.S. cablecasters) at prices as high as $900 for delivery in the spring of 1984. GE has announced plans to test-market complete TV sets with integrated NABTS teletext decoders in late 1983. A WST standard teletext decoder (not compatible with NABTS) is now available in some areas for late-model Zenith TV sets at a cost of $300.

LINE 21	TELETEXT

DECODER PENETRATION

According to NCI figures, approximately 72,000 line-21 decoders have been purchased nationwide since they became available in 1980. Some cable operators, hotels and hospitals are making decoders available to subscribers, guests and patients. Qualified veterans of the U.S. armed services can receive decoders free of charge. Public-service organizations distribute decoders to needy people.	WST teletext decoders (not compatible with NABTS) are in use by a few hundred consumers nationwide. Some line-21 captioning is being transcoded to WST teletext. The only NABTS teletext decoders in operation are broadcast-professional models.

TEXT SERVICES

Line-21 text services scroll from the bottom of the screen to the top. Information which has scrolled off the top of the screen cannot be recalled. Users wishing to access particular information must wait for those items to appear. Some information appears according to a fixed schedule, requiring the user to stay close to the TV set and watch the clock. Two channels of line-21 text are available on any single broadcast signal. When the broadcaster is also carrying line-21 closed captioning, simultaneous text services are slowed considerably to allow for caption transmission. The line-21 system is not capable of displaying graphics.	Teletext information is organized into screens (or "pages"), like the pages of a magazine. The viewer selects a particular page, and that page remains on the screen until another page is selected. There is no scrolling effect, allowing the user to spend as much time as desired reading the information. Teletext pages are available throughout the day, relieving the viewer of any requirement to access according to a fixed schedule. Teletext pages may contain highly detailed graphics to illustrate highway systems, weather patterns, theater and restaurant seating plans, airline and public-transportation routes, advertised products, etc.

CLOSED CAPTIONING

LINE 21

Line-21 captioning is restricted in placement to the top third and bottom third of the screen. Eight vertical positions and seven horizontal tab stops are available. Only one typeface is available, plus italics and underlining, and all characters are the same size. Captions are always surrounded by rectangular black background masks. No graphics are possible. Caption text may be transmitted as white letters or in any of six colors, although most line-21 decoders are incapable of displaying colored text. Captions are transmitted at the rate of 60 characters per second. This places a limit on the speed at which captions may appear and disappear, sometimes causing difficulty in synchronizing the captioning to rapidly changing video. The slow transmission rate increases the lag inherent in "real-time" stenographic captioning. Captioning slows the operation of text services.

TELETEXT

Teletext captions may be placed by the captioning agency anywhere on the viewer's screen. Twenty vertical and forty horizontal positions are available, allowing the captioning agency to indicate more clearly who is speaking and to avoid obscuring important parts of the picture. A variety of typefaces and type sizes are available, also useful in differentiating among actors' voices, sound effects, narration, etc. Captions may appear with or without rectangular background masks. Individual letters and background masks may be transmitted in any of thousands of colors. Graphics may be included, in order to clarify sound effects, etc. Captioning is transmitted at the rate of thousands of characters per second, allowing precise synchronization with video and reducing the lag of real-time captioning. Teletext captioning has no noticeable effect on the speed with which magazine pages may be accessed.

LINE 21	TELETEXT
TECHNICAL REQUIREMENTS	
Networks and broadcasters need no special equipment in order to carry line-21 services. Line-21 captioning may be recorded in closed form on most home VCRs. The low data rate of the line-21 system makes it theoretically more reliable in troublesome reception areas. A full line of a broadcaster's VBI must be dedicated to line-21 captioning and is thus unavailable for other uses, such as teletext.	Networks and broadcasters may be required to make modest equipment investments in order to carry teletext services with maximum reliability. Current home VCRs cannot record teletext captioning in closed form. The high data rate of teletext requires good television reception, placing additional demands on domestic antennas and cable systems. Later-model decoders are expected to address this issue. Teletext captions require only part of a VBI line's total data-carrying capacity and may be integrated with other teletext services using the same line(s).
SOCIAL IMPLICATIONS	
The line-21 system has made television accessible to thousands of hearing-impaired people. The sales of line-21 decoders have been far below expectations, however. The relatively small audience for line-21 services makes it difficult to find widespread non-government funding for closed captioning. Since the line-21 system is designed primarily for the hearing-impaired minority, widespread use of line-21 decoders is unlikely, and the information available on the service is narrow in focus. The line-21 system requires that hearing-impaired people pay extra for a special adaptive device.	Teletext services are designed to appeal to a broad general audience. If consumer teletext is successful, the services it provides will be available to everyone for the cost of a decoder; hearing-impaired people will not have to pay extra for captioning services. Widespread use of teletext will mean that hearing-impaired people will be able to access a wide range of information, including captioning, even when they are away from home. Families with hearing-impaired members will find a teletext decoder of greater value to the entire household than a line-21 decoder. Teletext draws hearing-impaired people into the mainstream and provides a broader range of services and information.

THE FUTURE

LINE 21

The National Captioning Institute predicts that line-21 decoders will continue to sell at the rate of about [illegible]er month, well below [illegible]l expectations of 100,000 per year. The line-21 system will not be able to provide any services other than the closed captioning and scrolling text for which it was originally designed. It is not compatible with teletext magazine services. The cost of set-top line-21 adapters is not expected to fall much below the $250-$300 range.

TELETEXT

Although it looks promising, the success of consumer NABTS teletext is not guaranteed. NABTS is the de facto standard endorsed by CBS, NBC, Canadian broadcasters, and the majority of U.S. cable teletext services. If teletext is successful, all consumers will have access to closed captioning and will be able to access any of hundreds of freshly updated pages of text and graphics. Up-to-the-minute information available via teletext includes news, bulletins, sports, stock prices, national weather, program listings, consumer information, advertising, etc. In areas served by local teletext operations, consumers may access information about local school closings, weather, transportation advisories, airline schedules, community calendar, classified ads, local news, etc. Industry leaders suggest that built-in teletext decoders will eventually be available for $50-$100 over the cost of a regular TV set.

THE WGBH CAPTION CENTER
QUESTIONS AND ANSWERS ABOUT CAPTIONING

1. WHAT ARE CAPTIONS?

Captions are essentially the same as subtitles; they are words displayed on a TV screen to convey the audio portion of a program.

2. WHO BENEFITS FROM CAPTIONS?

More than 16 million Americans of all ages suffer from some degree of hearing loss significant enough to impair their ability to understand and enjoy television. This invisible impairment is the largest single disability in America.

3. WHO PRODUCES CAPTIONS?

The WGBH Caption Center and the National Captioning Institute (NCI) are the only facilities within the United States capable of producing captions for broadcast. Competition between the agencies results in better service to broadcasters, lower captioning costs, and faster technical development.

4. HOW MUCH DOES CAPTIONING COST AND WHO PAYS FOR IT?

Captioning can cost as much as $2500 per program hour, including the cost for preparing the captioned master videotape. Captioning is funded from a variety of resources including government, advertisers, networks, producers, and donations from organizations and individuals.

5. WHAT IS THE ROLE OF THE FEDERAL GOVERNMENT IN FUNDING CAPTIONS?

Despite efforts of the two captioning agencies to locate private funding sources for captioning, the federal government is the single largest funder of captioning projects. Government funding has resulted in a substantial increase in the number of hours of captioned television and has also supported the technical development of line-21 closed captioning. No government funds have been granted to date for the development of closed captioning in teletext format.

6. WHAT IS THE DIFFERENCE BETWEEN OPEN AND CLOSED CAPTIONS?

OPEN CAPTIONS are visible to every viewer whose TV set is tuned to an open-captioned program. Because no special decoding equipment is required to see open captions, all viewers see them whether they need to or not. Closed captions were developed in response to hearing viewers' complaints that open captions detract from their viewing pleasure.

CLOSED CAPTIONS are visible only on television sets which are equipped with special decoding devices. Most captions now produced in the United States are closed captions. Two technologies are available for producing closed captions; both involve delivery of digital data via the vertical blanking interval of a broadcast signal:

a. Line-21 captioning is a broadcast service intended specifically for hearing-impaired viewers. TeleCaption decoders (purchase price is in the $250 range) or Colormax decoders (available from some cable-TV operators for a monthly fee) are required to display line-21 captions. According to National Captioning Institute figures, approximately 72,000 homes in the U.S. are decoder-equipped.

b. Teletext captioning is broadcast as part of a general-audience text service. In addition to closed captions, teletext can deliver up-to-the-minute information on hundreds of topics such as weather, world and local news events, traffic reports, sports, stock markets, etc. Teletext technology has been in development for several years in the U.S. CBS and NBC currently broadcast national teletext magazines. Teletext is also available in Canada and on certain cable systems in the U.S. Many European countries already have well-established teletext services which include captioning; no special-purpose captioning adapter is required. Mass-produced teletext decoders are expected on the U.S. market in 1984. Because teletext services address both hearing and hearing-impaired viewers, the potential market for teletext decoders is many times greater than that for line-21 decoders. The price of teletext decoders is expected to become quite reasonable as sales increase.

7. ARE LINE-21 AND TELETEXT SERVICES COMPATIBLE?

The line-21 system, like teletext, is a method for using a broadcast TV signal to send digital data, along with the regular sound and picture, to home decoders. A line-21 decoder, however, cannot receive teletext pages or teletext captioning. Teletext information is transmitted at a much higher data rate and with more sophisticated coding, thus prohibiting its reception by line-21 decoders. In this sense, the two services are not compatible. But since line-21 and teletext services do not interfere with each other, a broadcaster may chose to carry closed captioning in both formats simultaneously.

One method for this is called transcoding. As demonstrated by the National Captioning Institute using WST teletext (not compatible with NABTS), closed captioning data in the line-21 format is transcoded during broadcast and simultaneously transmitted in its original form and as teletext. The captioning is thus accessible to users of line-21 decoders and teletext decoders alike. The teletext captions will be very similar in appearance to the original line-21 captions; the wide variety of teletext display options are unavailable with transcoding techniques.

The other method for broadcasting simultaneous line-21 and teletext captioning, called dual mode, is the system used by the WGBH Caption Center and the Canadian Captioning Development Agency. Dual-mode techniques permit captioning agencies to prepare original line-21 and NABTS teletext captions simultaneously. When the captioning is broadcast, users of line-21 decoders see ordinary line-21 captions. Users of teletext decoders, however, see captioning with the enhanced display options available to that medium--unrestricted screen placement, variable typefaces and sizes, color and graphics.

THE WGBH CAPTION CENTER: A CHRONOLOGY
1971-1983

1971 WGBH develops open-captioning technology and captions THE FRENCH CHEF, ZOOM, and other national WGBH productions with funding from the U.S. Bureau of Education for the Handicapped.

1973 - 1982 WGBH produces the nightly CAPTIONED ABC NEWS for broadcast with open captions on more than 200 PBS stations nationwide. Funding is provided by the U.S. Bureau of Education for the Handicapped (later the Department of Education). In 1982, this contract was redefined to require real-time closed captioning and awarded to NCI.

1977 - 1982 The WGBH Caption Center undertakes the Multi-Level Captioning Project to develop special captioning techniques for children's programming, to caption programs for school distribution according to this "multi-level captioning system," and to publish a multi-media "Caption Kit" as an educational tool for hearing-impaired students, their teachers and their parents. Funding is from the Department of Education.

1977 - 1980 WGBH participates with PBS in the development of the line-21 closed captioning system and the establishment of the National Captioning Institute.

1980 The WGBH Caption Center establishes a working relationship with CBS to develop closed captioning in teletext format.

The Caption Center independently develops its own line-21 closed-captioning capability.

1981 The Los Angeles branch office of the WGBH Caption Center is established to caption selected CBS programs in teletext format for broadcast as part of CBS's Extravision teletext service.

1982 Most national WGBH productions begin to include captioning as a line-item in their production budgets, in conformance with a new WGBH policy treating captioning as a routine part of program production.

The WGBH Caption Center develops fast-turnaround techniques for closed captioning down-to-the-wire WGBH productions such as FRONTLINE.

WGBH begins producing a local teletext magazine service, SCOOP, for use in area secondary schools.

The United States Department of Education awards a $1.9 million contract to the WGBH Caption Center to closed caption prime-time movies on one or more commercial networks using dual-mode techniques where possible. This contract was terminated in January, 1983, "at the convenience of the government" and subsequently awarded to NCI on a sole-source basis.

PBS awards a contract to the WGBH Caption Center to closed caption 81 hours of public-TV programming. The contract calls for the provision of teletext captioning, in addition to line 21, as soon as possible.

--continued--

1983 CBS's national teletext magazine, Extravision, includes WGBH-produced teletext captions as an integral component of the national broadcast service.

PBS awards a contract to the WGBH Caption Center to closed caption 46-53 hours of public-TV programming.

The WGBH Caption Center closed captions most of WGBH's national productions.

The WGBH Caption Center closed captions approximately 40-50 commercials/ month.

The WGBH Caption Center begins producing the first dual-mode captions (simultaneous line-21 and teletext) aired in the United States.

GLAD

GREATER LOS ANGELES COUNCIL ON DEAFNESS, INC.

A Coordinating Council for over 45 Member Organizations of, by and for the Deaf

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October 26, 1983

Annette Posell
The Caption Center
WGBH-TV
125 Western Ave.,
Boston, MA 02134

Dear Annette,

I understand that WGBH will be giving testimony about Teletext befor the House Subcommittee on Science, Research and Technology. I would like to comment on the importance of Teletext and its relation to the hearing impaired consumer.

Our agency, the Greater Los Angeles Council on Deafness, Inc., took part in evaluating the Teletext system during the demonstration period in Los Angeles in 1982. We had TV sets and decoders at our office and at my home. I was able to watch several hours of closed captioned programs each week and also had access to the Teletext pages. Clients in our offices viewed the Teletext pages daily while the set was installed here.

The closed captioning was technically well done and showed great promise of capability to provide similar captioning for any number of programs. The pages of information were definitely an asset to a hearing impaired person who does not have access to instant news through regular TV broadcasts or radio. Emergency information, weather, traffic, information, etc., was immediately available by turning to the right page. This combination of closed captioning and information available through one system was found by all hearing impaired viewers to be of considerable importance, convenience and enjoyment. The hearing impaired in the United States comprise over 15,000,000 people with varying degrees of hearing loss. Many of this population cannot afford to buy special equipment to receive closed captions. It is important that Teletext be allowed to develop and produce captioning as a part of its services instead of as an additional, added expense in the future. The deaf have waited many years for

the development of closed captioning. The Line 21 system has proven its worth, but it is also important to see that Teletext is developed to serve the hearing impaired and that it become available within reasonable cost and within a reasonable time.

As a deaf individual and administrator of an agency serving the deaf and hearing impaired, I would like to see Teletext made available to all consumers with a built-in device that would make selection of captions just a matter of turning a switch on or off. I believe there is great potential in the Teletext system and its value to the hearing impaired is without question.

GLADly yours,

Marcella M. Meyer

Marcella M. Meyer
Executive Director

MMM:dg

GLAD

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October 25, 1983

Ms. Annette Posell
Caption Center WGBH-TV
125 Western Avenue
Boston, MA 02134

Dear Annette:

Deaf people in Los Angeles were once fortunate because we have had the opportunity to see the teletext captioning at work when it was in the experimental stage a few years ago. These televisions with teletext captioning were available to us, deaf viewers, in several different locations. We raved about the quality of captioning transmitted through the teletext system. We were saddened when the teletext experiment in Los Angeles came to the end.

Today we still want very much to see the widespread availability of teletext-captioning TV in the United States. Its advanced technology would bring further parity to viewers toward television. The only thing that has disappointed us lately is that the teletext captioning didn't make available to us sooner. Should it come to us tomorrow, it'll surely be a very significant milestone for Deaf Americans on TV accessibility.

Sincerely,

Lawrence R. Fleischer

Lawrence R. Fleischer
President, GLAD

LRF/lsc

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October 20, 1983

Ms. Annette Posell
Caption Center WGBH-TV
125 Western Avenue
Boston, MA 02134

Dear Annette,

It is with enthusiasm that I endorse the concept of Telextext system that I have seen (Extravision and similar video presentations.) It certainly improves watching television and makes it more meaningful since it is a visual program of several pages with captions on the screen. This enables us to participate in the general public and to stay abreast of current news. The "news" offered is interesting and very informative. We encourage more developments like this.

There are three concerns that are present now:

1) When are these devices available?

2) Do we need to buy extra decoders when we already have captioned decoders for line 21?

3) If yes to no. 2, how much will it cost?

Teletext is an exciting way to access into a powerful medium that is accessible to the hearing impaired and certainly will do a lot to enhance the growth of information acquisition for the hearing impaired.

Sincerely,

John F Levesque

John F Levesque
Executive Director

A United Way Agency

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AGENCE CANADIENNE DE DÉVELOPPEMENT DU SOUS-TITRAGE

Our File: 400-4

October 25, 1983

Ms. Annette Posell
Manager of Marketing and
Public Relations
The Caption Centre
WGBH-TV
125 Western Avenue
Boston, Massachusetts 02134

Dear Ms. Posell:

Further to your telex of October 18, in which you requested that Sanderson Layng forward written support for Telidon and teletext as they benefit hearing-impaired viewers, I am replying on Sanderson's behalf.

At the same time, by a hand-delivered copy of your telex and my response to you, I am asking Dr. Keith Chang, Director, Field Trials, of the Canadian Federal Department of Communications, to provide you with a similar and, if possible, more detailed description of such benefits.

As you are aware, our Agency opted shortly after our inception to go a dual-mode route with respect to captioning because of the perceived benefits of Telidon and teletext, over and above the basic captioning service available on the PBS Line 21 system to hearing-impaired viewers. In this regard, specifically, CCDA contracted with Norpak Ltd. of Kanata to develop such a dual-mode system, as Norpak is regarded among the leaders, if not the leader, in the manufacturing of Telidon equipment.

As far as specific benefits of Telidon and teletext, the following come to mind immediately:

- greater comprehension of captioned programming, through the provision of graphics to both augment the written caption and to indicate off-camera action (e.g. telephone ringing or door knocking);

- greater flexibility in presentation, in terms of caption size, colour, placement, number of rows;

.../2

City Centre Tower, 880 Wellington St. Suite 611, Ottawa, Ont. K1R 6K7, Tel.: (613) 232-6521/232-5144

- conservation of scarce vertical blanking interval (VBI) spectrum through sharing of lines between captioning and teletext services aimed at the general public;

- permitting hearing-impaired viewers, by means of one rather than a multiplicity of terminals, to have access not only to captioning but the full range of Telidon services;

- as a corollary to the above, facilitating the integration of the hearing-impaired community into the mainstream of society, in terms of how they, along with everyone else, can access entertainment, education and information.

As tangible proof of the Canadian federal government's endorsement of and interest in the integration of captioning with Telidon and teletext, I would remind you of the fact, which you may wish to bring to the attention of the U.S. House Sub-Committee on Science, Technology and Research, that the federal Department of Communications has invested to date, or committed, nearly half a million dollars to our Agency for this specific purpose.

I trust the above provides you with the written support you have requested. However, should you wish additional information or documentation, please do not hesitate to call me at (613) 232-6521 or (613) 232-5144.

In closing, may I also express that Dr. Chang's kindly anticipated support will also enhance the case you wish to make.

Yours truly,

J. Robert Lucyk
Vice-President
Government/Industry Relations

c.c. Sanderson Layng
Keith Chang
Lynton Hutchison

Mr. DYMALLY. Let's go to Mr. Pimentel, please. Am I pronouncing that correctly?

Mr. PIMENTEL. Thank you, Mr. Chairman.

That's right, that's right, Mr. Pimentel. OK.

Mr. Chairman, I have my statement for the record and in the interest of time I will not read it, I will add additional comments.

Mr. DYMALLY. Without objection, it shall be entered into the record.

Mr. PIMENTEL. Many people, Mr. Chairman, have commented about the 72,000 figure of decoders in purchase, how disappointed they are with the low number of decoders purchased by hearing-impaired people.

I submit, Mr. Chairman, that a large part of that is the fact that we do not have access to CBS programing. It is well-known in this country that CBS has the best programing. It is a little bit like a person buying a new car and not being able to travel over the best highways. A car's value is substantially decreased if you can't use it for its full purpose. And the same way, admittedly we are paying a high price for decoders—$250, and not having access to the best programs that the networks provide.

That is a tremendous disappointment to deaf people and certainly that negatively impacts on the sale of decoders. So you have a chicken and egg situation—people don't buy decoders because if they buy one, they can't see CBS programs.

There is really a very deliberate crisis of confidence that CBS has created by this. You have heard today, Mr. Chairman, the figure of 18 to 24 months before teletext decoders will be available. I had that figure quoted to me 3 years ago—18 to 24 months. It is a point where we are, just about to turn around and never quite seem to get there.

I would also like to point out, Mr. Chairman, for the record here, that we have gone to CBS and asked them if they would copy the past programing that have captioned on video cassettes and make them available to deaf people separately from television, and they have denied that reasonable request.

I have asked CBS if they would make the present captioning available through cable television since no one can see it now. They have denied that request.

CBS has not indicated any real good-faith commitment to deaf people. They have denied us very reasonable requests. We are not against new technology. We agree that there's a great deal of potential in teletext technology for deaf people. But there are a lot of deaf people living and dying today who do not have access and will die before they have access to CBS programing.

You heard this morning an example of a cerebral palsy deaf person in a hospital. There are thousands of other examples of people not having access to television for no reasonable reason for that lack of access.

CBS, while they are developing teletext technology can and should, and have a corporate responsibility to make their programing available through line 21 as an interim basis. And it is very possible with teletext technology either through compatibility or dual mode transmission to continue to make captioning available through line 21 for deaf people.

It is analogous to the situation years ago when CBS, also leading in technology, first developed color television. It was their intention, their desire to make people have to buy a color television set because it was not their intention to transmit color programing through the black and white sets. It required a regulation by FCC to make color television accessible on black and white sets.

And, Mr. Chairman, it may require an act of the Congress or regulation of FCC to protect the millions of dollars invested by deaf people in line 21 decoders to assure that they are not deliberately made obsolete. It would require a deliberate act on the part of CBS to make them obsolete because the technology exists to make CBS programing, even through teletext, also available on line 21.

The fact that CBS is not interested in doing this indicates a corporate disregard for the interest and needs of deaf people in this country.

We are really here asking for the protection of the Congress in mandating that all captioning be available to deaf people. Deaf people, by and large, constitute a large group of poor people in this country. We are on the lower economic strata of society. We do not have the dollars to pay for two decoders. More than that, technologically it is not necessary except because of the corporate greed of one corporation in this country, we should not permit that in this country. And I hope we won't permit that.

It is not just the cost—perhaps with mass production of teletext, the dollars invested in a TV decoder may be less; but teletext involves very high-speed broadcast signals. And usually most of the homes in this country will have to upgrade their antennas in order to receive teletext in their home. That will be an additional cost placed on the backs of deaf and hard of hearing people in this country to receive teletext.

No one this morning has mentioned the additional cost of modifying or adding to existing antennas to assure that teletext reception can actually be received in the homes of deaf people.

One other additional point I would like to make, Mr. Chairman, is that there has been a lot of emphasis on the electronic magazine and textual services. You saw this morning some beautiful pictures of what teletext can do.

We don't dispute that it can do that. But deaf and hard of hearing people in this country basically desire access to the existing programing from networks. We want to see the show and the news that is regularly broadcast. We are not primarily interested in all the additional electronic magazine potential of teletext.

I am not saying that it will not help deaf and hard of hearing people, but I am saying that is not our primary need. And yet, that is the primary purpose of teletext to provide textual services unrelated to the regular programs that we have. That would be of interest to hearing impaired persons and it would help us but we primarily want access to existing programing. That's not the primary purpose of teletext.

So, it is our request that the Congress of the United States, in cooperation with FCC, assure that deaf people have access to program-related captioning. And that it be done at the same time protecting the millions of dollars that deaf people have already invested in teletext decoders.

Thank you.
Mr. DYMALLY. Thank you very much.
[The prepared statement of Mr. Pimentel follows:]

Statement of

Albert T. Pimentel

Executive Director
National Association of the Deaf

before the

Subcommittee on Science, Research and Technology
House Committee on Science and Technology

Hearings on Developing Technologies
for Television Captioning:
Benefits for the Hearing Impaired

November 9, 1983

Mr. Chairman, my name is Albert T. Pimentel. I am the Executive Director of the National Association of the Deaf, 814 Thayer Avenue, Silver Spring, Maryland. I would like to thank the subcommittee for allowing the National Association of the Deaf to comment on the issue of developing technologies for television captioning.

The National Association of the Deaf (N.A.D.) is the largest consumer group of hearing impaired individuals in the nation. It was established in 1880, and has chapters in every state and the District of Columbia. Our membership consists of hearing-impaired persons, parents of hearing-impaired children, and professionals in fields related to deafness. The N.A.D. advocates for the needs of the 16 million hearing impaired Americans, in legislative, judicial and administrative forums.

The most profound impact of the disability of deafness is that deaf persons are cut off from most forms of information which people who can hear take for granted. This is not only true in day-to-day conversations, but also in the increasingly important area of telecommunications. Deaf people have difficulty using the telephone without special adaptive devices. We obviously cannot receive information available over the radio. And we cannot benefit from the audio portion of television

broadcasting. Therefore, deaf people often cannot obtain vital information that is readily available to people who can hear. This can be life-threatening in the case of weather and other emergency information which is usually broadcast on radio and television. But the inability to understand television has broader impact on the deaf community, cutting us off from the wealth of information and entertainment that is so easily absorbed by the rest of the general public. Without access to television programming, deaf people are denied news, trends, consumer information and a wide variety of basic information that we need. Deaf people traditionally suffer from isolation, which is increased by our inability to take advantage of the media services available through television broadcasting.

The incidence of hearing loss is increasing, affecting more Americans every year. But the deaf community is too small to have any significant impact in the market place. The current Administration has looked to "market place regulation" to assure a fair distribution of many services and rights. This approach might be appropriate where mass consumer action can be expected to influence the service providers, or where consumer dollars are sufficient to assure provision of adequate services. But the deaf community cannot affect market place forces. We seek the protection of federal laws and regulations to assure even minimal access to such basic needs as telecommunications services.

Without government protection in this area, our needs are too easily ignored and discounted, and our plea for specialized services goes unmet.

Increased access to television programming is the highest priority of the members of the National Association of the Deaf. No cause in recent memory has sparked enthusiasm and united deaf Americans so strongly as the right to be able to enjoy the medium of television. Our support for the closed-caption system of decoding has been demonstrated by millions of dollars invested by deaf people in Line 21 decoding equipment. This system consists of captions and other information which are carried on "line 21" of the vertical blanking interval of the television broadcast spectrum. Since 1979, the F.C.C. has reserved use of Line 21 for the broadcast of captions for hearing-impaired viewers. Captions carried on Line 21 are only visible on television receivers which are equipped with special decoders. Although the decoder represents an additional expense for deaf television viewers, the deaf community has been enthusiastic about the development and increase in the use of Line 21 captions. This support is particularly significant in light of the limited number of hours which are currently being captioned, and the fact that deaf people are largely in the lowest income brackets. Line 21 has proven itself to be a viable system, both commercially and technically. It works, and deaf people have been able to benefit from some captioned television programming since 1979 as a result.

The Columbia Broadcasting System (C.B.S.) has never supported the development of Line 21 captioning, and has attempted to create a crisis of confidence in the continued viability of the Line 21 system. C.B.S. is the only network which has steadfastly refused to caption its programs on the Line 21 system to make them accessible to deaf viewers. It has even deleted captions which have been placed on advertisements and specials by sponsors. C.B.S. officials have stated that the Line 21 system is obsolete, since their teletext systems will offer superior services, and C.B.S. officials have discouraged the deaf community from investing in and using Line 21 decoders. This stand has prevailed at C.B.S. from 1979 until the present, despite a comparatively full schedule of captioned prime time television programming offered by the American Broadcasting Company, National Broadcasting Company, and Public Broadcasting Service, and despite an absence of any captioning available on C.B.S. Teletext is still not available, and there are no assurances about when, if ever, it will become available, whether and how much captioning will be offered via teletext, and what the cost will be to the deaf consumer to buy the necessary decoding equipment.

The deaf community needs access to television now. This has been explicitly acknowledged by all branches of government. Congress passed a Joint Resolution in December, 1982, making December National Closed Captioned Television Month. The Supreme

Court has acknowledged that:

> (T)he public interest would be served by making television broadcasting more available and more understandable to the substantial portion of our population that is handicapped by impaired hearing. . . No party suggests that a (television) licensee, whether commercial or public, may simply ignore the needs of the hearing impaired in discharging its responsibilities to the community which it serves." Community Television of Southern California v. Gottfried, ___ U.S. ___ (1983), Slip Op. 9-10.

Finally, the Federal Communications Commission has acknowledged its concern about the needs of deaf viewers to have access to telecommunications services. See, e.g., Use of Telecasts to Inform and Alert Viewers with Impaired Hearing, 26 F.C.C.2d 917 (1970); Amendment of Part 73 of the Rules to Establish Requirements for Captioning of Emergency Messages on Television, 61 F.C.C.2d 565 (1977); "Captioning for the Deaf", 63 F.C.C.2d 378 (1976).

However, despite this recognition of the problem, federal efforts have been ineffective to protect deaf viewers and give us access to television programming. We are concerned that the development of teletext in an unregulated environment will injure the deaf community and result in less, rather than more, of the captioning services we need.

We have watched and been involved in the development of teletext technology. Teletext is not new; in fact, teletext prototypes predate the Line 21 system and have been in use in other countries for some years. Any technology that has the potential to present visual information is of great interest to deaf people. Teletext is basically designed for people with

normal hearing who want supplementary information services. It is primarily a text information system. This is a potentially useful system for all television viewers, but it does not meet the primary need of the deaf viewer: captioning so that the deaf viewer can understand the audio portion of the television program. Although teletext offers the potential for captioning, this service is a secondary potential. There is no guarantee that teletext providers would provide captioning service at all. Unlike the Line 21 system, teletext is profit-oriented, so that only profitable services can be expected to be offered. The teletext decoder gives the deaf viewer services which he or she does not necessarily want or need (airline scheduling, sports information, etc.) To get access to teletext captioning, the deaf viewer would thus be forced to spend additional money to buy into a system that contains unnecessary supplementary services. This is like asking deaf drivers to buy automobiles equipped with radios, air conditioning and other expensive options, in order to get basic transportation service.

Assuming that C.B.S. provides teletext services at some date in the future, the deaf viewer who wants to have access to C.B.S. programming will be faced with a dilemma: captioned C.B.S. programming will only be available on teletext, but teletext captions cannot be picked up on the deaf viewer's Line 21 decoder. The deaf viewer must invest in a Line 21 decoder in order to pick up Line 21 captions, and in a teletext decoder in order to pick up captions offered only in the teletext format.

The long delay in bringing out teletext, and the tentative nature of preliminary entries into the teletext market, indicate marketing uncertainties that are far from resolution. Teletext represents an interesting, potentially helpful, technology, but its acceptance in the marketplace has not been tested. Deaf viewers have the largest incentive to invest in this technology because of their prescing need for universal captioning on all networks. But even this need may be insufficient to justify deaf community investment in teletext, due to the small number of hours projected for captioned C.B.S. programming on teletext. Deaf viewers are thus being asked to shoulder a large investment in a risky new technology, on top of the sizeable investment they have already made in Line 21 equipment. There are no guarantees that teletext will actually be offered, that it will continue to be offered, or that it will offer the captioning services for which deaf viewers would purchase the equipment. This is an unreasonable burden to put on the small community of deaf viewers, who are seeking basic access to minimal information services (the audio portion of current broadcasts) rather than expensive supplementary teletext services.

It is inefficient and not cost-effective to ask deaf viewers to purchase two decoders in order to have access to captions. An analogy is found in the area of color/monochrome television broadcasting. In the early phases of development of color broadcasting, the F.C.C. mandated compatibility between the two broadcast methods, so that owners of black and white television

receivers would be able to pick up programs broadcast in color, and vice versa. As a result, we do not have to buy two television receivers to get both kinds of transmissions. Deaf viewers are in need of the same kind of protection, to assure that we can get access to basic television service without having to purchase additional unnecessary equipment.

The F.C.C.'s recent teletext decision reserved Line 21 for closed-captions for an additional five years. However, it did not mandate any kind of compatibility between Line 21 captions and teletext, nor did it suggest in any way that teletext operators must provide any captioning services. The refusal of the F.C.C. to act in this area is due to lack of community interest and concern for a vulnerable group of disadvantaged people: deaf and hard of hearing persons.

Deaf people currently receive captioning through their Line 21 decoders. The advent of teletext captioning remains speculative for most deaf viewers and most areas of the country. However, if it does become available, deaf viewers will immediately face the dilemma of whether or not to purchase the additional decoder necessary to receive these teletext captions. Technology exists now by which Line 21 and teletext captions can be broadcast in a compatible dual mode format, receivable via either Line 21 or teletext decoders. C.B.S. remains obstinately unwilling to transmit captions that can be received by Line 21 decoders, despite the great hardship to deaf viewers. With dual mode captioning, deaf viewers will not be penalized

while C.B.S. and other broadcasters continue to develop teletext services and to sort out the technical and marketing obstacles to a stable teletext market.

We ask that Congress mandate a single means of access to closed television captioning for deaf viewers. This could be accomplished by requiring a compatible teletext/Line 21 system for broadcast of closed captions, or by requiring dual mode transmission of all captioning, so that owners of either type of decoder could pick up all captions. The technology for compatible broadcast of closed captions exists. But without a mandate from Congress, it will not be used. The F.C.C. has refrained from taking action, relying instead on "open market regulation" to define the development of teletext services. Under such a system, deaf viewers will continue to suffer from inadequate captioning and the possible collapse of captioning services. The National Association of the Deaf believes that full compatibility between transmission methods of closed captioning is necessary to assure that deaf viewers are no longer denied access to this fundamental method of communication.

Mr. DYMALLY. Thank you very much. Dr. Garretson.

STATEMENT OF MERVIN D. GARRETSON WAS GIVEN THROUGH AN INTERPRETER, FRANCIS X. BURTON, ASSOCIATE, SIGN LANGUAGE ASSOCIATES, INC.

Mr. GARRETSON. Thank you, Mr. Chairman.

My name is Merv D. Garretson. I am the assistant to the president of Gallaudet College. Like Dr. Pimentel, I would like to abbreviate my paper and make a few comments. OK?

I am appearing before you today, not as an expert in telecommunication technology but as a representative, as a deaf consumer, and a user of caption services.

I would like at first to comment on a couple of things that were said this morning. Congressman Harkin had mentioned that in Great Britain they had 252,000 decoders, and that in France they have 80,000 decoders. And he was wondering why in the United States we only had 72,000.

The fact of the matter is that in Britain and France, the decoders are bought by hearing people, but here in the United States they are all bought by deaf people. There is a big difference there.

I think that we need to look at the isolation of deafness and the fact that it's very expensive to be deaf as it is for other disabilities.

Ironic as it may sound in the United States, disabled people have to buy equality. I could explain that we need to pay for telephone adaptabilities, for lights, for smoke detector signals, and TV decoders. Because of that, accessibility becomes very important. And accessibility to me means not only to have a decoder but having sufficient hours of TV programing.

Let me share some facts with you about the metro Washington—metropolitan area.

I checked the TV fare for the last 2 weeks and learned that the deaf person with a decoder receives about 4 percent of the total TV programing received by hearing persons, and that's with a decoder. A large part of that is because of CBS's refusal to participate. For example, in the metro Washington area, people have 1,300 hours a week of accessibility to them from the major TV stations and PBS stations. Programs that are closed-captioned only average between 50 and 60 hours.

To make it even more dismal, sometimes three captioned programs appear at the same time. And you can—you can only watch one. So that reduces our options for TV programing even more. Now, the breakdown for the last 2 weeks was for ABC 16 hours; for the different PBS stations, between 35 and 40 hours; and 4 hours from NBC. And from CBS, we received a total blackout—now, the only time a deaf person turns on CBS is to watch maybe a major football game.

We are very, very grateful to ABC for its great sensitivity within the last 3 years as they have little by little increased their offerings on TV.

I would like to add another thing. During the day, there's almost no TV accessibility possible. People who work at nights, housewives, or usually retired people, people of that nature, don't have an opportunity for TV except for maybe Sesame Street, and a few

other programs. And during the evening, after 11 o'clock, there is no captioning occurring on TV.

It has been said that about 300,000 hearing-impaired people watch captioned TV. And I heard the other day that the sales of the decoders are close to 75,000. Now, I don't think that's a bad figure but the important thing to understand is that when you think of service for the disabled minority, you are not thinking of numbers. There's no way to justify numerically the needs of the blind, the deaf, people who are wheelchair-bound, without accessibility.

From the very start, CBS has adamantly refused to participate in line 21 even though the deaf community supports their efforts on teletext and think that innovative technology is a need. But if they could still caption a few programs while they are working on teletext this would be appreciated.

In 1980, Gene Mater of CBS was at Gallaudet College giving a demonstration of the teletext device. At that time, he said that it would be unfair to the hearing-impaired community for them to encourage purchase of equipment that would soon become obsolete. Now, that was in November 1980.

He also stated that teletext was coming soon and we will be testing it next month, and it will be on the market next year. And that was 3 years ago.

Deaf people who bought the decoder for $250 3 years ago have more than sufficiently received their money back.

So now after 3½ years, ABC, PBS, and to some extent, NBC have made a portion of their shows accessible for deaf people, while CBS still shows the crass materialism and disdain of a large corporation for a small group of people.

We recommend that since the United States is not a socialist country, that we expect large corporations to show some degree of public interest and public service. And that Congress should think of a way to require the major TV stations to provide some amount of TV accessibility.

I think that it is time for Congress to intervene in this matter. I believe that access to the public to the airwaves is legal as well as a moral right.

Thank you, sir.

[The prepared statement of Mr. Garretson follows:]

TV Accessibility for Hearing Impaired Persons

My name is Mervin D. Garretson. I am special assistant to the president of Gallaudet College, which has for 120 years been the world's only liberal arts college for deaf students. Gallaudet is nationally and internationally known as a comprehensive center for deafness education, professional training, research, public service and advocacy. I am appearing before you today, not as an expert in telecommunications technology, but as a representative deaf consumer, a user of captioned television services.

We appreciate very much this opportunity to share with this distinguished body our concerns about television accessibility for the nearly 20 million American citizens who suffer some degree of hearing loss.

For years the deaf community of this nation (and of other countries) has struggled against the formidable communication barrier imposed by hearing loss. Although it does not have to be, deafness is an isolating handicap. Not being able to hear places one on the periphery -- a presence but not always a part of the American mainstream. In order to receive some degree of access in today's world the deaf person must budget for it. It is expensive to be deaf, and for that matter, to have any kind of disability.

Ironic as it may sound, it's a fact that disabled people in the United States have to pay for equality.

In order to use a telephone a deaf person must purchase a telecommunications device which enables him to call other people with a similar setup. In addition to wearing an expensive hearing aid, hard of hearing individuals may need to buy an amplifier for their telephone. Since hearing impaired people are not able to hear their doorbell, smoke detector alarm, or telephone, they must install a system of light signals for each room. And for their television set they purchase a TeleCaption decoder, hoping the cost justifies a reasonable number of captioned programs each week.

TV accessibility for the hearing impaired has implications that are much greater than simply entertainment and recreation. The radio, theatre, and downtown movies generally are incomprehensible to the deaf population. So the visual medium of closed captioned television becomes an important form of insurance against cultural deprivation. TV exposure keeps the deaf individual in tune with society, with changing language and idiom and with social trends and thought through its sheer volume of editorial/political viewpoints, presidential addresses, information on local, national, and international events, popular soaps, movies, and yes, captioned commercials and other programs, even if sometimes of questionable value. Recent research has shown captioned TV to be effective. It works not only for

hearing impaired people but for bilinguals and others in need of language and reading comprehension reinforcement.

A review of the television fare over the last two weeks shows that hearing impaired persons are receiving relatively little from the networks, although this little has to be an improvement over the nothing at all of several years ago. The TV viewing audience of the metropolitan Washington area has available to them a weekly average of 1,300 hours of television broadcasting from both commercial and public broadcasting stations. This does not include cable television, which also has great potential for closed captioning. During this same interval programs that are closed captioned range between 50 and 60 hours, or four and a half percent of the total.

To make the picture a bit more dismal, an additional frustration for hearing impaired televiewers is that on some evenings as many as three captioned TV programs may appear on the same time slot which considerably reduces the actual number of program options during the week. On some nights only one 30-minute program may be captioned, or even none at all.

The breakdown of weekly captioned prog-amd averages 16 hours for ABC, 35-40 hours for the various PBS stations, and four hours for NBC. We receive a total blackout from CBS, and tend to turn on that channel only to watch a professional football game. Among the commercial networks ABC has shown the greatest sensitivity for the Line 21

closed-captioning system and each year has increased the number of accessible programs on its channel. For this the deaf community will always be grateful.

I might add that during daytime hours captioned TV offerings are minimal or non-existent except for programs like "Sesame Street" and an occasional repeat of a PBS show like "Masterpiece Theatre." This means that for the elderly, retired deaf person, the nightshift worker, the deaf housewife, and others who are at home, the television set is just a piece of furniture. Hearing impaired people who are up after 11:00 p.m. may as well forget TV as nothing is hardly ever captioned after that hour. So, for most practical purposes television for the deaf individual continues to offer a very limited and barren world, a communication desert with only an occasional welcome oasis.

Media Services and Captioned Films of the U.S. Office of Education spent more than 10 years of study and experimentation to develop a captioned television system which would not distract the general hearing public. The resultant closed-captioned Line 21 system, with the National Captioning Institute and the Sears Tele-Caption decoder became operational in March 1980 -- more than three and a half years ago. Today nearly 75,000 decoders are in use, with a viewing audience of over a quarter of a million people. The number continues to increase slowly as more people with hearing loss

become aware of the system and the doors that have been opened.

From the very start CBS has adamantly refused to participate. In the early stages of the testing program they offered a variety of excuses but today their position is that "it would be unfair to the hearing impaired community to encourage purchase of equipment that may soon be rendered obsolete." This statement was made by Gene Mater of CBS at a Teletext demonstration at Gallaudet College in November 1980. As of this moment, a full three years later, most deaf people will say that the $250 investment in a decoder has more than paid for itself. Despite correspondence from CBS going back to 1980 that Teletext "is coming next month," "will be on the market next year," Line 21 has been making TV accessible to hearing impaired people for three and a half years while Teletext today remains an illusion and tomorrow's promise.

When, if ever, Teletext finally makes its long heralded appearance we have no assurance that it will be reasonably priced or whether CBS will actually provide captioned programs for what they appear to view as a small and insignificant audience. We would hope that the concept of compatibility will be recognized through dual captioning so that the deaf consumer is not forced to purchase a second decoder. The American deaf community has repeatedly reiterated its support of experimentation in new and innovative technology such as Teletext and videotext, but has urged CBS to participate in Line 21 while seeking new horizons on the TV scene. We believe

a modicum of public interest and public service to be integral to American private industry. Crass materialistm and insensitivity to the needs of certain segments of our population can only invite Congressional intervention in the form of special legislation.

We believe the time has come for such intervention. It is only fair and just that a corporate giant like CBS assume its share of the responsibility thoughtfully taken by ABC, PBS, and to a lesser extent, NBC, in making an important telecommunications medium understandable to American people with a hearing loss. We believe access to the public airwaves to be a legal as well as a moral right.

Thank you.

MERVIN D. GARRETSON

Special Assistant to the President
Gallaudet College

Office:
Gallaudet College
800 Florida Avenue N.E.
Washington, D.C. 20002
202-651-5005

Residence:
3509 Kayson Street
Wheaton, Maryland
20906
301-949-9789

Personal: Born July 25, 1923, Sheridan, Wyoming. Became deaf at the age of five from spinal meningitis. Married to Carol J. Kaull, five daughters

Education: B.A. Gallaudet College, 1947 (with honors)
Major: Education of the Deaf; minor: English

M.A. University of Wyoming, 1955 (with Phi Kappa Phi honors) Major: English

Doctoral studies in English, University of Maryland, 1963 through 1966

LL.D., Gallaudet College, 1974

Seminar courses in administration:

National Academy for School Executives (1972-1973)
"The Administrator and Current Innovations"
"The Administrative Team"
" Evaluating the Instructional Staff"

American Management Association (AMA) 1975
"Senior Project Management"

Professional: Maryland School for the Deaf, Frederick, Maryland
Classroom instructor, junior and senior high school
1947-1949

Montana School for the Deaf and Blind, Great Falls, Montana, Classroom instructor, elementary level, 1949-1950

Professional (cont.): Principal, Department for the Deaf, Montana School for the Deaf and Blind, 1950-1962

Associate Professor of Education, Gallaudet College, 1962-1967

Executive Director, Council of Organizations Serving the Deaf, 4201 Connecticut Avenue NW, Washington, DC, 1967-1970

Principal/Director of Instruction, Model Secondary School for the Deaf, Washington, D.C., 1970-1975

Assistant to the Dean, Pre-College Programs, Gallaudet College, 1976-1978

Special Assistant to the President, Gallaudet College, 1978 - present (1983)

Professional Services:

U.S. Office of Education, Commission on Teacher Training Programs, 1960-1964
President, Council of Organizations Serving the Deaf, 1966-1967, becoming Executive Director in 1967
President's Committee on Employment of the Handicapped, 1964-present
World Federation of the Deaf: Board of Directors, 1967 through 1971; international president of the Commission on Pedagogy, 1971-1980; international vice president for pedagogy, 1980-1983
National Association of Hearing and Speech Agencies (NAHSA), secretary of the Board of Directors, 1970-1973
Board of Directors, Educational Media Corp., 1969-1975
Board of Directors, H.E.A.R. Foundation, 1976-present
National Association of the Deaf: regional board member, 1960-1967; secretary-treasurer, 1966-1967; president, 1976-1978; vice president, 1980-1982
Special Assistant, United Nations Task Force on Technical Assistance Manual on Deafness, 1971-1974
Public Law 94-142 Visitation Panel, National Education Association, 1977-1978
Public Law 94-142 Regulations Writing Task Force, 1975
Consultant on state-wide educational planning for deaf children: Montana State Board of Education; Alaska Department of Education; Venezuela Department of Special Ed.
Board of Directors, Cued Speech Center, 1979-1980

Publications: (selected)

"Higher Education of the Deaf in the Western Part of the United States." Proceedings of the Convention of the American Instructors of the Deaf, 1956
"Coordination and Teamwork Among Local, State, and National Organizations of the Deaf." Proceedings of the Workshop on Community Development Through Organizations of and for the Deaf, 1961

"The Simultaneous Method, " in Communication With the Deaf, Powrie V. Doctor, ed., American Annals of the Deaf, 1963
"Gallaudet's First Hundred Years," (with Louie Fant), Rehabilitation Record, May/June 1964
"The Social Studies Concept," Proceedings of the International Conference on Education of the Deaf, 1965

Education and Rehabilitation of the Deaf: A Question of Relevance, COSD Monograph, 1969
"Social Adjustment of School Leavers in the United States," International Audiology (Audiologie Internationale) Vol. 8, No. 4, October 1969

"The Handicap of Deafness," Report of the Special Study Institute, University of Georgia, 1970
"The MSSD Scene," Proceedings of the Conference of Executives of American Schools for the Deaf, 1972
"The Administrative Team: A View from MIddle Management," Proceedings of the Conference of Executives of American Schools for the Deaf, 1974

"Perspectives into the Deaf Community," National Symposium on Mental Health Needs of the Deaf, 1976
"Total Communication," in Hearing Impairment: Trends in the USA, A Bicentennial Monograph, D. Robert Frisina, ed., Alexander Graham Bell Association for the Deaf, 1976

"The Education for All Handicapped Children Act of 1975," The British Deaf News, Vol. 11, 2, April, 1977
"Communicating in International Sign," Gallaudet Today, Winter, 1971
"Deaf People and the Political Process," Gallaudet Today, Fall, 1979

"Gallaudet College: Its Emerging Advocacy Role," Disabled USA, Vol. 2, No. 2, 1978
"Mainstreaming: A View from Kendall Green," Perspectives, May, 1980

Publications (cont.): "The Deaf Child and the Unwritten Curriculum," in The Deaf American, May 1977; Directions, Vol. 2, No. 1, 1981; The Integration and Disintegration of the Deaf in Society, George Montgomery, ed., Scottish Workshop Publications, 1981

"The Reality of Deafness," in The Deaf American, October 1980; Directions, Vol. 2, No. 2, 1981; as "Gehörlosigkeit --wie sie wirklich ist," Höneschädigten Pädagogik, 34, 6, December 1980

"Mathematics, Language and the Deaf," Directions, Vol. 3, No. 1, 1982
"Gallaudet and Clerc: Perspectives," Gallaudet Today, Winter, 1982
"Milan Re-Visited," Gallaudet Today, Winter, 1980

Honors and Awards:

Phi Alpha Phi, Gallaudet scholastic honorary
Phi Kappa Phi, national honor society, University of Wyoming
Doctor of Laws (LL.D.); Gallaudet College, 1974
Junior National Association of the Deaf
Award of Merit, 1969
Keeper of the Flame Award, 1970
Medallion of the Mayor of Paris for International Service, 1971
International Solidarity Medal, World Federation of the Deaf, 1975
Plaque of Appreciation, The Israeli Association of the Deaf, 1981
Kappa Gamma Man of the Year Award
Dedication of the 1932 Tower Clock by the Class of 1982

Mr. DYMALLY. Thank you very much, Doctor.

We will go back to Mr. Ball for conclusion and then we will have a couple of questions.

Mr. BALL. Thank you, Mr. Chairman.

I also, for the sake of time, will not read my written testimony. I would like it—if it could be, included in the record, however.

Mr. DYMALLY. Mr. Ball, let me just say for the record, all of those witnesses who had written testimony, their testimony would be entered into the record.

Mr. BALL. As my written testimony indicates, I am the president of the National Captioning Institute. I would point out that we are the National Captioning Institute; we are not the National Line 21 Captioning Institute, nor, indeed, the National Teletext Captioning Institute.

NCI was set up as a nonprofit corporation in early 1979 with startup moneys from the Federal Government for the sole purpose of providing access to television for hearing-handicapped people.

We utilize a technology that was developed for that purpose, not because it was thought to be the best technology but, rather, at the time when it was first thought of, there was little interest—in fact, no interest—on the part of the major broadcasters in this country, in what was the evolving teletext technology as was being developed in Europe.

It was a consequence of that lack of interest and it was also as a consequence of the need to provide access that the line 21 technology was developed at that time.

Even today, the technology is not in competition with teletext. We firmly believe, as we have demonstrated, and as we have heard from Mr. Connelly from WKRC in Cincinnati, for a mere investment of $2,000 at a network, programs that are captioned either in teletext or in line 21, can be similarly broadcast and distributed nationwide in the other service.

What I don't think has become too clear to Congress today is that it is not really an issue between line 21 and teletext, rather, there's an even greater issue that affects most of us as citizens and as consumers, on the future of teletext itself.

Most of the presentations led us to believe, it seemed to me listening to it, that the issue was line 21 versus teletext. There are really two incompatible contenders for the marketplace in this country at this moment. One of these, as has been referred to, is the NABTS system, is being supported by both CBS and NBC, and others.

The other system that the ABC affiliate uses in Cincinnati and which is also in use on cable television, and there has been no discussion today about the access needed for hearing-impaired people to cable television. But on cable television today there is an incompatible system to the NABTS system. So even the general public in the future—if one or the other does not gain dominance, and that's not likely to happen until lots of millions of dollars are spent, and lots of promotion and advertising goes on over the next 5 to 10 years—we will see one or other gain dominance.

We have heard reference to the technology and the costs benefits from large-scale production. And one of the testifiers made reference to video games. It's true that a number of years ago, you could

buy a video game for $100 and all it did was play ping-pong on your television set. What the testifier failed to point out, that today you could do much more than that. But if you buy an Intelevision game you can't play it on your Atari set, and if you buy an Atari game you can't play it on your Intelevision player.

The same is true with the video cassette industry, which is a fast growing industry. If you buy a Beta video cassette recorder, you can't play VHS tapes on it. By the same token, if you buy a VHS recorder you can't play your Beta tapes on it.

But there's nothing wrong with marketplace; marketplace has many attributes. And the FCC has chosen to go that way in technology. But by the same token, this FCC—which is probably one of the most conservative FCC's that we've had in recent memory—has chosen to protect line 21, not because it looks upon line 21 in competition with teletext, but it is aware that teletext itself is still only a promise.

We have also had testimony today, Mr. Chairman, about disappointing sales of decoders, and that's been attributed to NCI. Well, we take some responsibility for that, but we were not set up to sell decoders. And even today, we do it in concert with many national associations of the deaf, but that was not our purpose.

Our purpose was to caption programs and thereby make them available to the hearing-impaired.

We recognize that a yardstick—but is not the only yardstick—a yardstick for measuring the usefulness of a service is the number of people that access it. And that we are disappointed there are only 72,000 homes. But they are still homes, they are still people that have bought the decoders—and they have invested over $20 million in these decoders.

Nonetheless, as early as mid-1980, recognizing the reluctance of CBS to participate in the service, we made what we thought was a rather daring and generous offer—we said if the marketplace is the place that determines the system, we are willing to caption on both line 21 and teletext. That offer still stands today. And despite the developments that are taking place in teletext, and it's still not here. In our predictions of 1979 that it's the technology of the 21st century, we still believe that's true, because the technology that you are going to see evolve in teletext over these next few years is going to be two in competing technologies, both of which are still searching for a market.

The market is not the deaf. We, to some extent, sadly demonstrated that. And the broadcasters and others in this business are not interested in that market. The market they are looking at are the 83 million households in this country that access television. That's the market that will determine teletext.

Further, that service will include captioning remains to be seen. There has been no commitment today on the part of any of the teletext proponents to guarantee that with the introduction of teletext there will be a substantial amount of programing captioned. And that is what the issue is: Access to television programing; not the substitution of ancillary services in place of that access.

We recognize at NCI that that access is very important to the deaf, is very important to the deaf to know that there are traffic blocks on 14th Street Bridge, or that tomorrow's weather is going

to be a lot worse than we anticipated. That's equally important to the deaf as it is to the rest of us.

But that is no substitute for television access. Television access is what you and I have enjoyed for these 30 to 40 years, which is sitting down at home with your family watching television programs.

The advantage of the line 21 system beyond the fact that it is the only national system available today is the fact that it is compatible, it is compatible with teletext, it is compatible with all known broadcasting systems, and that includes satellites, microwave, video tape machines, you name it. But more than that, it is compatible with cable.

The line 21 system is presently on cable and we now have a commitment from the National Cable Television Association that they are going to support its substantial introduction on cable. Beyond that it is also compatible with home video.

Teletext is not compatible with home video. Teletext, as a technology, will still deny the deaf the right that you and I have to go out and buy a video cassette, incompatible as they may be, but we choose a Beta or a VHS, or even a video disk. We can go out and buy one and we can rent programs, and sit and watch them at home.

Line 21 technology allows you to do that and it allows the deaf to do that. It does not allow you to do that if you move to a teletext technology.

We are not against teletext. We are, as I said at the opening of my statement, we are a captioning agency. Our business is making sure that more and more programing, irrespective of the distribution means, is available to the hearing impaired.

Comments were also made about the advances in technology in Britain, France, and Canada.

In closing, I would like to make a few comments on that. First of all, these three countries run broadcasting systems that are largely government controlled. We do not have that kind of system. In fact, as the FCC said in its teletext ruling, it welcomes the voluntary participation of broadcasters in providing a captioning service.

NCI, nor any other proponents of closed captioning, have advocated action by Congress or by the FCC in mandating captioning. I grant you that there are people in the deaf community—and I can understand their position in saying there should be mandated access.

We have never argued that. We believe that with the cooperation of broadcasters, that access can become available because we do operate as consumers in a marketplace environment as it relates to the broadcasting industry.

But back to Britain—in the early seventies, Britain developed teletext and they introduced it as a public service in 1976. As the leader of the British Broadcasting Corp.'s teletext service admitted in a paper, he published that teletext service was developed for the specific purpose of providing access to the hearing impaired. However, it was forgotten about. The technology became so interesting in providing all these text pages that it was forgotten about.

It was only in the last couple of years with deaf leaders like Dr. Pimentel and Dr. Garretson going over there telling their counterparts in Britain as to their growing access to television, that the

BBC in its appropriations of last year, these additional appropriations that were made by the British Government were made on the condition that teletext must provide access.

As a result, the BBC, despite 7 years of teletext service, is now putting into service its own captioning agency.

With regards to the French, we have heard of the French interest in the technology. Again, the same thing happened there. The technology in France, the teletext technology, was developed, and in fact up until fairly recently was viewed as an informational type service.

It was only through the visit of deaf leaders from this country to France that triggered the interest of the deaf in France to get the Government to have the French broadcasters make such a commitment. That commitment, as some testimony has said today, is only 2 hours a week. Not a whole lot, but at least it's a start.

With regards to Canada, the Canadian broadcasters adopted the line 21 system universally more than 2 years ago. It is true the Canadian Government has been spending lots of money in the development—the Canadian development of the teletext videotex technology—and they are continuing to do that.

However, the Canadian Government also has mandated—and in fact I have a letter from the Canadian Broadcasting Corp. to the effect that if in the future the Canadian Broadcasting Corp. does introduce the teletext service, it will in no way harm the line 21 service that is now available there.

With regards to the commercial counterpart in Canada, they have no interest in teletext. They have told us that over and over. And they are continuing to support the line 21 service.

So the idea that there is some groundswell towards this technology of teletext, neglecting the fact that teletext itself has severe problems, we have testifiers today say we can use it for computers; we can use it for electronic mail delivery. That's all very true. But that's not the issue that you had before you today.

The issue is access to television for deaf people. All these other facilities are going to be great for all of us. But it does not substitute for access to television.

In closing, I would just like to say that as the station in Cincinnati has shown for a mere $2,000, you can provide and you can explore—and you have every right as a broadcaster to explore other revenue potentials that teletext may one day provide—but as they have demonstrated in exploring that, they are providing line 21 captioning simultaneously.

They are compatible. We think Congress should know that, and we think any argument that suggests they are not is not founded in fact because we have evidence of it as presented today. And I think the future is compatibility.

As someone else referred to in color television, we have compatibility. We have compatibility on cable, and there is no reason why we can't have compatibility in captioning.

And with that, I conclude my testimony.

[The prepared statement of Mr. Ball follows:]

TESTIMONY

before the Science, Research and Technology Subcommittee
of the House Committee on Science and Technology
By John E.D. Ball, President
National Captioning Institute, Inc.
November 9, 1983

The National Captioning Institute (NCI) is the nonprofit, single-purpose corporation which was established in 1979 with federal start-up grant monies to provide access to television for hearing-handicapped people utilizing a new and innovative technology called "closed-captioned television." Closed captions, invisible unless triggered by a special decoding device, enable viewers to read on the TV screen what they cannot hear. This device is commonly referred to as a Line 21 decoder. NCI has captioning centers on both coasts in close proximity to major TV production houses and network broadcast origination centers. NCI's Board of Directors is composed of recognized leaders in business and television (list attached). Advisory councils from the Writers' Guild of America, the nation's hearing-impaired community, and the corporate world actively monitor and promote NCI's services. NCI staff members are highly qualified and firmly committed to the overall mission of the company.

President Reagan recently stated: *"The initiation in March 1980 of closed-captioned television, which opened this important communications medium to millions of deaf and hearing-impaired Americans, is a significant achievement toward this end (to bring the handicapped of our Nation into the mainstream of society)."* The occasion for the President's remarks was his proclaiming last December as National Closed-Captioned Television Month as voted in Joint Resolution by the Senate and the House (text attached).

This sociological breakthrough is the first of its kind anywhere in the world. Its broad scope and significant benefits are being hailed across the nation as having "this century's greatest impact" 1/ on hearing-disabled citizens of all ages. An Emmy from the Academy of Television Arts and Sciences and special awards from the International Association of Broadcasters, the American Speech-Language-Hearing Association, and Action for Children's Television are representative of the widespread acclaim being bestowed on the closed-captioning system. Every major organization serving this country's hearing-impaired population has joined other notable associations in officially endorsing NCI's singular service:

National/International Organizations

Action for Children's Television
Alexander Graham Bell Association for the Deaf
American Association of Advertising Agencies
American Speech-Language-Hearing Association
Automotive Advertisers Council
Convention of American Instructors of the Deaf
Gallaudet College Alumni Association
General Federation of Women's Clubs
International Association of Parents of the Deaf
International Catholic Deaf Association
International Federation of Advertising Agencies
Lions Clubs International
National Association of the Deaf
National Cable Television Association
National Committee * Arts for the Handicapped
National Congress of Jewish Deaf
National Education Association
National Fraternal Society of the Deaf
National Parent Teacher Association (PTA)
Quota International
Registry of Interpreters for the Deaf
Sertoma Foundation
Telecommunication Devices for the Deaf, Inc.
Writers Guild of America, East
Writers Guild of America, West

1/ All quotes about closed-captioned television come from letters on file at NCI.

State Associations

Empire State Association of the Deaf
Illinois Association of the Deaf
Maryland Association of the Deaf
Michigan Association of the Deaf
Pennsylvania Society for the Advancement of the Deaf
Virginia Association of the Deaf
Wisconsin Association of the Deaf

The National Association of the Deaf has officially proclaimed "TV access" to be its most important advocacy issue and unanimously acclaimed NCI's role in facilitating that access. In addition, NCI receives thousands of letters each year from hearing-impaired children and their parents, from deaf or hard-of-hearing adults, and many others -- all expressing their appreciation of the closed-captioned television service. The following is a representative sample:

From the father of a deaf child in Texas:

- *"Our 8-year-old son misses out on so much that the hearing world takes for granted. He will never hear the sound of a symphony, or a sigh of contentment, or the bark of a dog, but now at least he can 'hear' events on television."*

And from a hearing-impaired youngster in South Dakota:

- *"My captioning adapter is really neat. . . . It will probably turn me into a speed reader and also increase my vocabulary."*

And from an educator of the hearing impaired in Connecticut:

- *"The children are getting entertainment and learning words and phrases, too. It's like making castor oil taste good."*

And from a senior citizen in Illinois:

- *"I have only been deaf 6 years after a stroke. My caption decoder is the most expensive thing I have bought except my hearing aid, but it's what I love the most."*

And from a hearing social worker in Florida:

- *"In my contacts with the deaf and hard-of-hearing community, I can detect more awareness of the world around them and the events that are happening in this 'outside world' since closed captioning began. . . . For each letter you receive, know that there are thousands more out there . . . who say a heartfelt 'thank you' in their silent, but beautiful way."*

And from a non-hearing college student in New York who expresses the basic theme of all:

- *"I am grateful for the American way of life - the "can do" that surmounts all obstacles and makes possible . . . reading captions on television so that a deaf individual may take pride in the fact that he is learning and enjoying as much as his hearing friends."*

In March 1980, NCI's national closed-captioned service made its debut with 16 hours of prime-time programs on the ABC, NBC, and PBS networks. Today, some 40 hours of closed-captioned television programs are available each week nationwide.

- Network television now provides access to news, sports, and other televised current events. NCI, in cooperation with the ABC-TV network, captions "World News Tonight," "Monday Night Football," Presidential speeches and press conferences, space shuttle launches, and other special events. These live broadcasts are accomplished through the use of a recent NCI innovation called "real-time" captioning.

- TV commercials are also captioned by NCI in cooperation with more than 200 national television advertisers.

- Syndicated programs including Robert Schuller's "Hour of Power," "The Jeffersons," and "The People's Court" are broadcast with captions by many local affiliates of all three commercial networks and independent stations.

- Home video movies on videocassette and videodisk are available in cooperation with RCA/Columbia, CBS/Fox Video, Paramount, and MGM/UA.

- Cable TV programming includes Showtime's "Bizarre" series, selected movies, and Metrosports football and basketball games.

In addition, the National Cable Television Association's Board recently endorsed NCI's captioning service and committed its support to the expansion of closed captions on cable TV programming. In concert, the cable industry is offering Line 21 decoders specifically manufactured for use on cable TV systems for lease to hearing-impaired subscribers for as little as $6/month. These decoders are fully compatible with the TV adapter and integrated TV set (with built-in decoder) already on the market. All can be used for decoding captions on broadcast or videocassette/videodisk programs.

As a consequence of these and other developments, the closed-captioning service is vibrant and growing. Its increasing breadth of utility in all forms of television program distribution to the home is clear testimony to the ruggedness, reliability, and versatility of the Line 21 technology upon which it is based. No other evolving technology can match it. It is indisputably the only technology available today, or in the near future, which can provide hearing-impaired citizens with comprehensive access to this nation's major mass communication medium -- television.

The current closed-captioned television service, however, is still in an embryonic stage. Less than 5 percent of all broadcast programs are captioned; even less on cable TV and home video programming. Growth of the national service is seriously hampered at this time by lack of universal adoption and support within the television industry. The introduction of new technologies must be done in a way that complements the Line 21 technology currently in use. Their introduction in any competitive way can only fracture and splinter the growing success of the national closed-captioned television service for hearing-impaired Americans. For while these new technologies can bring additional

services to the entire population, they will not in and of themselves increase the hearing-impaired audience or provide more captioned television programs. Rather, they will diminish that audience and reduce the volume of captioned programs if they attempt to force the premature obsolescence of the present technology at the expense of hearing-impaired viewers. Nearly 300,000 people in over 70,000 homes, deaf schools, and clubs across the country have invested more than $20,000,000 to date in the Line 21 closed-captioning technology. That costly personal investment must not be jeopardized merely to increase access to captioned television programs for hearing-handicapped citizens through the necessary purchase of a second decoder.

Teletext can and must be introduced in a manner that facilitates rather than retards the unrestricted access by hearing-impaired people to national television programming. NCI, in cooperation with WJLA-TV (Washington, D.C.) and World System Teletext (WST), demonstrated last November that Line 21 and teletext captions can be provided by the television industry in a thoroughly compatible way. Through the use of a simple and inexpensive device, a caption transcoder, the captions already present on Line 21 of the WJLA broadcast signal were inserted into the WST teletext signal for simultaneous broadcast during the demonstration. As a consequence, the closed-captioned television service was available through either a Line 21 decoder or a WST teletext decoder.

This compatible arrangement is routinely in use by WKRC-TV in Cincinnati, Ohio. WKRC-TV, a Taft Broadcasting TV station, is the only station in the nation currently broadcasting a publicly available broadcast teletext service. Under this arrangement, hearing-handicapped viewers of WKRC-TV can watch ABC-TV network programs which are captioned with either a Line 21 decoder or a teletext decoder manufactured by Zenith Radio Corporation. The hearing-impaired residents of Cincinnati are thus being given the right to choose one decoder over the other. But more than that, those who already had purchased a Line 21 decoder have not lost their closed-captioned

television service on WKRC-TV. This is a laudable and public spirited action by Taft Broadcasting which NCI hopes will be followed by other broadcasters who are planning to launch a broadcast teletext service. If not, hearing-impaired citizens will be forced to make a second investment in teletext decoders merely to gain access to the captioning provided on the broadcast teletext service. This would be grossly unfair to hearing-handicapped people. Rather, they should be given the same freedom of choice which the general public will have, i.e., to invest in teletext decoders only to the extent merited by the additional services which teletext can provide.

But what are the real near-term prospects for broadcast teletext? At best the future is very unclear for a number of reasons:

1. There is no single national teletext standard. In fact, there are two incompatible systems competing for marketplace dominance.

2. NABTS teletext decoders will not be available to the general public until next year at the earliest, and experts predict they will be very expensive for at least a few years after their introduction.

3. Those broadcasters who intend to provide a teletext service have made no public commitment to include any substantial volume of captioned television programming as an integral part of their service.

4. Broadcast teletext as authorized by the FCC is not covered by any mandatory carriage rule for cable TV, thus is may not be available in the homes of cable TV subscribers.

5. ABC, a major provider of closed-captioned television using the Line 21 technology, has made no public commitment to introduce a broadcast teletext service. CBS and NBC, on the other hand, have opted for and in fact introduced an NABTS-based teletext service. In contrast, Southern Satellite Systems, a major cable TV program distributor, has adopted the WST teletext system.

6. Broadcast teletext, as currently envisioned, has its greatest market potential as a local TV station-generated service. Few, if any, local stations have committed to providing a local teletext service due to the high cost involved and uncertainty about its marketability. Therefore, to the extent a local station chooses not to provide a local television service, the national service alone may not be sufficiently attractive to viewers in the local station market. Beyond that, even to pass through network-originated teletext services to the local station's market has attendant costs which nationally could amount to several million dollars. These predicaments will sorely try the economic viability of teletext.

7. Teletext reception, particularly in the UHF band, will be difficult in homes without superior antenna installations. This is a hidden cost associated with receiving teletext transmissions which many people, including those with impaired hearing, can ill afford.

8. Finally, public television stations KCET (Los Angeles) and WETA (Washington, D.C.) have recently discontinued their experimental teletext services. Time Inc. has also announced curtailment of its teletext developmental program.

Based on the above facts, it is clear that broadcast teletext faces an uncertain future in this country. For these reasons alone, teletext cannot be viewed as a technology which will in any foreseeable time frame be comparable to the Line 21 technology in providing access to television programming for hearing-handicapped people. Beyond that, there is a real justification for ensuring that broadcast teletext be introduced in a way that is compatible with the existing Line 21 technology. That assurance

of compatibility will obviously be in the best interests of the hearing-impaired population while not interfering with the legitimate right of broadcasters to explore the revenue potential of broadcast teletext. The Congress has already taken steps to facilitate compatibility through previous actions to protect the vital service provided to hearing-impaired constituents by the Line 21 technology. The FCC supported that position in March of this year through precluding access to line 21 by broadcast teletext. Maintaining that protection into the foreseeable future is clearly in the public interest.

I respectfully submit that this Congress has both an opportunity and an obligation to encourage all broadcasters to fully utilize the Line 21 technology for its intended purpose without further delay. Such action will further accelerate the growth and utilization of the mainstreaming closed-captioned television service for hearing-impaired American citizens.

11/4/83

NATIONAL
CAPTIONING
INSTITUTE,
INC.

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The National Captioning Institute is governed by a Board of Directors representing varied fields of expertise including television operations and management, advertising and marketing, program production, financing and retailing.

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*Executive Committee

Established Advisory Boards whose members represent the nation's hearing-handicapped community, its professional leaders, and television/motion picture writers assist NCI's Board of Directors through appropriate activities and recommendations.

5/5/83

Federal Register
Vol. 48, No. 1
Monday, January 3, 1983

Presidential Documents

Title 3—

The President

Proclamation 5008 of December 29, 1982

National Closed-Captioned Television Month

By the President of the United States of America

A Proclamation

Nothing is more important to the welfare and progress of the United States than the assurance that all its people are afforded equality of opportunities. Our Nation's commitment to open new doors of opportunity for people in all walks of life has guided the growth of our Nation and stands as a measure of its greatness.

The realization of our high hopes for a better America can be gauged by our ability to bring the handicapped of our Nation into the mainstream of society. The recent initiation in March 1980 of closed-captioned television, which opened this important communications medium to millions of deaf and hearing-impaired Americans, is a significant achievement toward this end. The development of closed-captioned television marks the culmination of many years of cooperative effort by government, private industry and nonprofit groups. It is breaking down historic communications barriers and opening new social, educational and vocational opportunities for the hearing-impaired.

In recognition of the invaluable service performed by closed-captioned television, and in order to call public attention to the contribution that it is making toward enriching the lives of millions of Americans, the Congress has, by joint resolution, requested that the President designate the month of December 1982 as "National Closed-Captioned Television Month."

NOW, THEREFORE, I, RONALD REAGAN, President of the United States of America, do hereby designate the month of December 1982 as National Closed-Captioned Television Month.

IN WITNESS WHEREOF, I have hereunto set my hand this twenty-ninth day of December, in the year of our Lord nineteen hundred and eighty-two, and of the Independence of the United States of America the two hundred and seventh.

Ronald Reagan

[FR Doc. 82-35048
Filed 12-30-82; 10:19 am]
Billing code 3195-01-M

JOINT RESOLUTION*

To authorize and request the President to designate the month of December 1982 as "National Closed-Captioned Television Month."

Whereas the Congress has officially proclaimed 1982 as the National Year of Disabled Persons;

Whereas hearing-handicapped Americans of all ages traditionally have suffered isolation from society and too often have unwillingly ended up as burdens to society rather than participating citizens;

Whereas the recent telecommunications breakthrough of "closed captioning" now enables these people to read on the television screen what they cannot hear and thus share -- for the first time in history -- that wealth of information, entertainment, and language so abundantly absorbed by the general public;

Whereas the innovative service, provided through the nonprofit and tax-exempt National Captioning Institute (NCI), represents the culmination of almost ten years of technological research and development, market exploration, and cooperation between government, industry, and community;

Whereas the nationwide service which began in March 1980 on ABC, NBC, and PBS is already proving to open up new educational horizons and new avenues toward equal opportunity for this severely disadvantaged population, particularly its children and youth;

Whereas hearing-impaired citizens have personally invested over $17,000,000 to date for purchase of decoding devices;

Whereas many members of the Congress have long been actively supporting development, implementation, and expansion of the closed-captioned television service which is the first of its kind anywhere in the world; and

Whereas President Reagan, referring to the closed captioning of his inaugural ceremonies and televised addresses to the Nation, has stated: "I feel very honored to be the first President in history to have spoken directly to people who had never before experienced this historic tradition.": Now, therefore be it

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the President of the United States is authorized and requested to issue a proclamation designating the month of December, 1982, as "National Closed-Captioned Television Month" in recognition of this invaluable new service for deaf and hard-of-hearing American citizens, and calling on the people of the United States to observe the month with appropriate programs, ceremonies, and activities.

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* S.J.RES. 258
H.R.RES. 618
97th Congress, 2nd Session

JOHN E. D. BALL, President, National Captioning Institute
5203 Leesburg Pike, Falls Church, VA 22041

PREVIOUS POSITIONS:

Public Broadcasting Service

Vice President for Engineering, 1978-79
Director of Engineering, 1977-78
Associate Director, Engineering, 1975-77
Manager, Transmission Engineering, 1972-75

Other positions held at PBS during the above period:

Director Engineering, Satellite Interconnection System Project Office, 1976-78

Project Director, PBS Closed-Captioning Project, 1972-78

Technical Project Director, PBS Closed-Captioning Project, 1978-79

Communications Satellite Corporation

Developed and implemented the Intelsat III and IV television transmission system, 1967-71.

Computer Sciences Corporation

Project leader of study on commercial uses of satellites. Author and major contributor of report on study findings submitted to the Executive Office of the President (ODTM) entitled "Domestic Uses of Satellites", 1966-67.

British Broadcasting Corporation, London England

Various positions held in Sound and Television Broadcasting. Final position was Senior Communications Engineer responsible for design and implementation of terrestrial microwave video and audio transmission facilities, 1953-66.

OTHER BUSINESS EXPERIENCES:

U.S. representative, International Telecommunications Union. National Sub-committee Chairman of ITV working group on television systems standardization.

Public Broadcasting Representative, European Broadcasting Union's Technical Committee.

Chairman, IEEE Committee, Television Technical Measurement Standards.

Chairman, Engineering Sub-committee of Electronics Industry Association on Multichannel Sound for Television.

Member of the National Cable Television Committee.

Television Consultant, United Nations Development Fund.

Television Satellite Communications Consultant, National Broadcasting Company,

Participating Member, various Intelsat Engineering working parties.

EDUCATION:

H.N.C.(EE) Royal College of Science and Technology, Glasgow, Scotland, 1961

AWARDS:

Recipient of the National Academy of Television Arts and Sciences Engineering "Emmy" - 1978. Awarded to PBS Engineering for the Design and Implementation of the Public Television Satellite Interconnection System

Project Director - National Academy of Television Arts & Sciences Engineering "Emmy" 1980 for Development of the Line 21 Closed-Captioning System

1980 Distinguished Service Award - American Speech-Language-Hearing Association in Recognition of Dedicated & Effective Contributions Significant to the Field of Speech-Language Pathology and Audiology

1983 - Honorary membership presented by the National Fraternal Society of the Deaf at its 24th Quadrennial convention. Award is twelfth granted since establishment of NFSD for exceptional service to deaf persons.

PUBLICATIONS:

Numerous papers and articles published in national and international broadcasting and communications journals

Mr. DYMALLY. Thank you very much, Mr. Ball.

These hearings are designed to give the public an opportunity to testify on specific issues. I find this an opportunity to give myself an education. So some of the questions I am going to ask you seem very elementary but this is my first exposure to this whole topic, and I welcome it.

Dr. Pimentel, why do you suppose CBS is reluctant to adopt line 21 on a temporary basis or as an alternative to their development of teletext? Is it cost? Is it obstinacy? What is it?

Mr. PIMENTEL. I have asked the same question. I don't think it's cost at all. While ultimately teletext will not depend on hearing people, nevertheless, the marketplace for teletext is going to be very difficult to develop. And deaf people do constitute at least an immediate entry into the market—we do need captioning.

I guess CBS feels they want to preserve the market potential of deaf people as an initial toehold rather than foothold into the marketplace, because we have a need for some kind of gadgetry to access CBS television programing. Or I might be guessing that CBS sees us an initial entry into the market until they manage to sell these programs to hearing people and other people, I think they want to use us as a toehold into that marketplace. That's my assumption.

If that's not true, then I don't know why certainly the issue is not money. CBS is the most financially successful corporation of all the networks. They have spent millions of dollars in their experimental and research and development of teletext. So their need for the deaf community is ultimately negligible but we do constitute an initial interest in decoders. And I assume that's what they think of us.

Mr. DYMALLY. Does it cost very much to convert, or at least to adopt line 21 before they conclude the research on teletext?

Mr. PIMENTEL. No, as Mr. Ball just pointed out, the cost of giving us access through line 21 while they complete teletext would be very, very small in terms of all the millions of dollars they have already put into teletext. That could have given us interim access through line 21. The issue is not money.

Mr. DYMALLY. Mr. Wick, CBS claims that line 21 is a developing obsolete technology and that's the reason why they don't want to pursue it. Mr. Wick?

Mr. WICK. I don't think it is obsolete at all. Meaning—but by obsolete, if line 21 can continue providing service, it will never become obsolete. Maybe CBS viewpoint on obsolescence relates, but not to the consumers, in their early equipment. But they need to purchase special equipment within CBS to broadcast that. Maybe they feel that there is no point in buying a Ping-pong video game for internal use in CBS when it's right there in front of your eyes. You have other exciting games which would cost less.

I don't know—I think that you should be asking CBS yourself those kinds of questions and I think CBS should be expected to answer them. And I think they should be expected to answer more broadly why they have ignored the requests of deaf people and very clearly explain what they are doing.

As I mentioned in my comments this morning, I am very, very puzzled about their insensitivity. I completely understand the feel-

ings of deaf people about CBS. But I can't afford to let this become an emotional issue because from my viewpoint I have stressed again and again it's an economic issue, and it must be resolved.

Mr. DYMALLY. Yes. That question should have really been directed to CBS but we didn't have time. And I am going to instruct the staff to send them a copy of this transcript and ask them to respond to some of those questions that we are asking you now.

Mr. DYMALLY. Ms. Isaacson, do you think the decline in the use is a result of the high cost of the decoders?

Ms. ISAACSON. I—I think that the volume of sales of line 21 decoders have been attributed to a number of factors, many of which have been cited here today—the relatively small volume of programing available on line 21; $250 to $300 costs. And at least a suggestion that there's an unwillingness on the part of some consumers to admit to a need for a special adaptive device.

I don't know that there's been any comprehensive study of the marketplace with respect to the volume of sales.

Mr. DYMALLY. Dr. Garretson, am I to understand, as a newcomer to this technology, that teletext and line 21 are incompatible?

Mr. GARRETSON. Well, as I said, I am really not an expert in telecommunications, but my impression is that they can be compatible. I think that with the dual captioning system, both can be very compatible—and just working different ways, but working together.

Mr. DYMALLY. I thank you very much for coming to testify. This has been most illuminating and for me an education. And as I said before, we should see that all the networks receive copies of this testimony. And we will put in a special request to CBS to respond to some of the questions I asked you.

Thank you very much.

[Whereupon, at 1:10 p.m., the subcommittee was adjourned.]

29-172 O—84——16

APPENDIX I

GREATER LOS ANGELES COUNCIL ON DEAFNESS, INC.
A Coordinating Council for over 45 Member Organizations of, by and for the Deaf
616 S. Westmoreland Avenue • Los Angeles, California 90005
Telephone Voice and TTY (213) 383-2220

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Voice or TDD (714) 531-2321
Voice or TDD (213) 929-1781

November 8, 1983

Ms. Carol Ponpliano
House of Representatives Subcommittee
on Science Research and Technology
2319 Rayburn House Building
Washington D.C. 20515

Dear Ms. Ponpliano:

This letter is written in response to your request for me to testify before the Subcommittee with reference to Teletext and its potential to the hearing impaired consumer.

Because of prior commitments dealing with the operation of the Greater Los Angeles Council on Deafness, I am not able at this time to travel to Washington D.C. to testify before the Subcommittee. I do, however, submit this written testimony and request that it be provided to the Subcommittee for their information:

In 1982, the Greater Los Angeles Council on Deafness, Inc. (GLAD) took part in evaluating the Teletext system during its demonstration period in Los Angeles. A Teletext system was placed in the lobby of our headquarters office so that clients coming to GLAD would be able to have access to the system. Additionally, one system was placed in my home for evaluation as a deaf person.

During the period that the system was available at the GLAD headquarters office. An average of 30 deaf persons per day would view the system and utilize it as a source of instant information dealing with news flashes, freeway conditions, airport scheduling, and the like. On several occasions, the system was made available during evening hours so that individuals from the deaf community would be able to view programs that were captioned. The overall response to the captioning as presented within the system was very positive. The quality of captioning and ease of reading was the strong point that separated Teletext captioning form that which is currently available through Line 21 decoders.

The magazine feature of the system proved definitely to be an asset to the hearing impaired who for the most part do not have access to emergency news flashes through regular television broadcasts or radio. Emergency information, weather, traffic information, etc., is immediately available by turning to the right page. This combination of closed captioning and instant information being made available within one system was found by all hearing impaired viewers to be of considerable importance, convenience and enjoyment.

With respect to my use of the system that was installed at my home, I found the system to be far more reliable than the existing Line 21 closed captioning. Unlike the Line 21 captioning, the Teletext captioning was clear, concise, and consistant. Captioning was not lost, garbled or otherwise unreadable. I was able to watch several hours of captioned programs each week and found myself looking forward to each program as it was aired.

Once the demonstration project was completed in the Los Angeles area and the systems were removed from my home and the GLAD headquarter office, they were sadly missed.

The hearing impaired in the United States comprise over 15,000,000 people with varying degrees of hearing loss. Many of these individuals cannot afford to purchase the special equipment that is necessary to view closed captioning. We feel strongly that it is important that Teletext be allowed to continue the development and production of captioning, maintaining that feature as a permanant part of the overall service to be provided by the system rather than as an added service and expense in the future.

The hearing impaired have waited many years for the development of closed captioning. The Line 21 system has been the forerunner in providing this service, however, it is important that the technology of Teletext be made available to the hearing impaired in the United States at a level that is equal to that of their hearing peers.

As a deaf individual and administrator of an agency serving the deaf and hearing impaired, I would like to see the Teletext system be made available to all consumers, both hearing and hearing impaired, with a device installed in the system that would make captioning available or not at the discretion of the viewer by the turning of a switch. I believe there is tremendous value and potential in the Teletext system, and its application and worth to the hearing impaired community in the United States is without question.

GLADly Yours,

MARCELLA M. MEYER
Executive Director

MMM:ad

APPENDIX II

19 Bannington Drive
Largo, MD 20772

Doug Walgren
Chairman
Subcommittee on Science
Research and Technology
House of Representatives
Washington, D C 20515

Dear Mr. Walgren

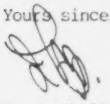
Thank you for providing me with a copy of the transcript of my comments given at your hearing on Developing Technologies for Television Captioning: Benefits for the Hearing Impaired. In going over the transcript I have noted numerous errors in the interpretative process and was initially at a loss as to what to do about this problem.

Reverse interpreting, that is interpreting from sign language and all its nuances to precise spoken English, is a difficult task requiring substantial skill and experience on the part of the interpreter. A single sign can represent many different words and variations of the same word and the interpreter must select from among the words it may be intended to represent depending upon the context of the sentence. This implies that the interpreter be familiar with the content of a proceedings and technical terminology. As a random example of this, a sign for "one" may also be used to denote the words "first" and "initial" and signs may not show the past or future tense--that is a single sign such as "desire" could also mean "desires", "desired", "desiring" and could be further interpreted as "want" or "wish" all depending upon the context of the statement being made. The selection of the proper word, tense, etc. is assisted by the deaf person mouthing the words, such as I did, but the interpreter must then be skilled also in lipreading.

At your hearing, you had interpreters with a wide variety of skill and experience and the deaf community appreciates the effort your subcommittee made to assure that the deaf persons participating and observing the hearings were able to follow the proceedings. Unfortunately, I was not assigned interpreters with skills adequate to follow my rather fast paced presentation and the result is a presentation which in parts is incomprehensible even to myself in trying to trace back the actual words and message intended. To make corrections on the draft transcription itself would result in so many changes that it might make your committee's proceedings suspect. I have, therefore, as a means of correcting this problem reproduced the transcript pages in question and marked the interpreting errors where I could and corrected them so that both the presentation as spoken (and I am not, of course able to distinguish genuine transcription errors from interpreting errors) and as intended are on the same page. I would suggest that you may wish to simply print the transcript as recorded and add my own corrections as an addition to the record or you may wish to print the transcipt and corrections as I am submitting as a substitute for the original transcrition alone. In either situation, the transcription will be printed as it was recorded.

I wish to thank you again for inviting me to appear before the Committee. I believe very strongly that the future comes only to those who prepare for it and I want very much for the future to come into the lives of deaf people throughout the nation and, indeed, the world.

Yours sincerely



E. Marshall Wick

Note: Underlined words are those actually given by the interpreter at the hearing; words on the line below underlined words are the words which were signed but misinterpreted.

STATEMENT OF E. MARSHALL WICK WAS GIVEN THROUGH AN INTERPRETER, RONALD COFFEY, GALLAUDET INTERPRETER SERVICES, ASSISTED BY WILLIAM ISHAM, STAFF INTERPRETER

Mr. WICK. My name is E. Marshall Wick. I am involved in a number of organizations related to deafness but I am not here today to speak for any of them. My comments today are strictly my own comments.

Now, I am going to skip part (PARTS) of my paper to get to the meat (SUBSTANCE) of what it is I would like to talk to you about or present to you today. And one point (THE FIRST POINT) is that the Line 21 system has and is serving deaf people and has done it well, and there's no question about that. And it will (IT WILL) continue to serve deaf people well in the future if certain steps are taken to make that possible. And Congress (CONGRESS) should continue to consider that, (THIS.)

The issue here is not whether one technology is better than another one, from my viewpoint. And the issue is not whether one system is or whether it will become obsolete. The issue here is whether or not we will be able to make television more accessible to deaf people. The issue is not whether we are going to make more television--accessible to (MORE HOURS OF TELEVISION ACCESSIBLE TO

NAME: HSY313030 Page 101

television, but make television more accessible to deaf
DEAF PEOPLE, BUT TO MAKE TELEVISION ACCESSIBLE TO MORE DEAF

people, not deaf people more accessible to television.
PEOPLE, NOT SIMPLY DEAF PEOPLE HAVING ACCESS TO MORE TV PROGRAMMING.

Maybe I've exaggerated a little bit on that point but that
I SHOULD EXPAND SINCE

is the meat of my discussion. As all of the speakers up to
SUBSTANCE

now have talked about the number of deaf people who are
MENTIONED

being served now, it seems very small. It seems like they've
NOW SEEMS

just scratched the surface. And I would agree with that and

I think that all deaf organizations would agree with that,

and would like more use of that.
USERS.

But my personal opinion is that almost entire--it's almost
THE PROBLEM IS

entirely related to the cost involved in captioning at the

present time--the cost of two different aspects. One is the

cost of the receiving captioning by deaf people and;

secondly, is to produce captioning for broadcasters--
THE SECOND IS THE COST

equipment for broadcasters.
AND THE COST OF EQUIPMENT

This morning we mentioned about the 1971 conference, and
THERE WAS MENTION

at that time it was announced that it would be possible to

have closed captioning--to close-caption programs within two

years and would increase to the cost of $20. Now, what
AT AN INCREMENTAL COST FOR DECODERS OF $20.

happened, very clearly, is that it didn't happen two years

later, it happened more than ten years later. And it didn't

cost $20 more; it cost $250 more. Okay.

Then the survey that shows that 94 percent of the deaf
THE SURVEY THAT THEN SHOWED

people are willing to buy decoders was valid but it was
POPULATION WERE

valid only in the context of what I just recently mentioned

NAME: FSY313030 Page 102

And at that time, deaf people believed that it would cost
THAT AT

$20.
$20 FOR DECODERS.

So, yes, I mean, I would buy the decoder if it was $20. I
THIS MEANS THEY WOULD BUY THE DECODERS IF THEY WERE $20

think that still stands today. I think that deaf people

would have bought the decoders and would still buy them if

it appeared reasonable. And what is reasonable for the
THE COST TO

people who now have decoders, like myself, and I have bought
(AND I HAVE BOUGHT 3 LINE 21

three Line 21 decoders. And I think $250 is a reasonable
DECODERS) AND TO THOSE WHO DON'T ISN'T THE SAME. I THINK

price for me but I am not the typical deaf person, and
A

neither are the other people here--who are here presently, or
DEAF PEOPLE PRESENTLY HERE

who presently own a decoder, who are an affluent group of

deaf people, or the innovators.

We are the ones who have been surveyed and will continue
SERVED

to be. And my concerns are not as a present user. My

concerns are what are we going to do to make it possible for

the masses of deaf people in America to have all the

benefits to learning about--or to obtain access to
OF LEARNING FROM--OR OBTAINING ACCESS

television. How can we make that possible?

Four years later, we see that it is possible to sell

the decoders for $250. It doesn't make a difference of
MANY DIFFERENCE

whether it is on Line 21 decoder or the teletext decoder.
A A

That's not the issue. The issue is what is possible for the

future to bring down the cost so that the price is not

consumer-resistant.

There's no hope at the present time that Line 21 would be
LINE 21 SYSTEM

able to do that, except for Congress to purchase the

decoders and distribute them, or to make a complete--to make
TO MAKE

it a complete tax-exempt item.
COMPLETELY

If it's left to the market, it will never change. That is

not to say that things haven't been done to try and cut down

the cost--they have been. Two hundred and fifty dollars for

the decoders this year, and that--that's the same price it

was four years ago even though manufacturing has gone up.
MANUFACTURING COSTS

And they have found ways--tried to find ways to cut the cost,

but still its a level far too high for most deaf people--

people that we should be concerned about.

I believe that the teletext offers a promise and I agree

that teletext doesn't really--is not the present thing, but
ISN'T A "REALITY"--IS NOT A "PRESENT" THING.

it's a future item. Some say two years, some say five, some

say ten. But that's not the issue to me.

The issue is what it is we are doing right now to make

sure that that future goal will be open to deaf people. The
BE TO OPEN TV

arguments about whta the networks are doing right now.
ARE ABOUT WHAT

again, I don't think that's really an issue. The ABC and--ABC
ABC

and PBS both say that they feel that the present system is

serving them well. But the new technologies--but they are
THEY ARE

not really getting involved in the new technologies or

dividing the resources. And they expect to spend money on
DIVERTING THEIR LIMITED RESOURCES AND THEY DON'T EXPECT TO

the development and what they have when we have the present
SPEND MONEY ON NEW DEVELOPMENTS WHEN WHAT THEY HAVE AT THE PRESENT

technology that is serving us well. I agree with them
IS SERVING THEM WELL.

completely.

The present system has to be maintained. There's nothing better right now than ABC or PBS's system.

The argument here is what is CBS doing or not going to do. In this area, I must say that I disagree with the approach that most organizations of the deaf people have taken in this matter. And I feel in a sense (IT MAKES SENSE) that ABC should not spend resources on new technologies but CBS should be focusing (IF CBS IS) their attention to new technologies to make sure that the future will come to deaf people. It won't happen by itself. They must do something about that. CBS has been doing something about it.

And what's five more hours of programming at the present compared to future benefits that may be coming from CBS's work? I will be among the first to criticize CBS because they've shown completely insensitive to deaf people or how (COMPLETE INSENSITIVITY TO DEAF PEOPLE IN HOW) they approach deaf people and deaf organizations. Their public relations efforts are lousy and (BUT) I won't allow that distract from my viewpoint that they have done tremendous service to deaf people by trying to make sure the future more accessible to deaf people.

It doesn't matter to me whether that happens two years from now, five years from now. But what's important to me is that it does happen. And what happens is that some (IF SOME) groups don't do development work--it won't happen. So let ABC

and PBS and NBC continue with their captioning and let Congress make sure that TV is accessible to the deaf clients because they have the decoders. And those who have the (LET'S MAKE IT SO THAT THOSE WHO HAVE) decoders now can continue to use them. That is--that point is necessary.

But let's do more than that. Let's make sure that new technologies that's promised now, (TECHNOLOGY THAT HAS PROMISE NOW) is developed for the future.

Secondly, the part of the technology that is the cost of (THE SECOND PART OF TECHNOLOGICAL DEVELOPMENTS IS RELATED TO THE) captioning in itself--we have to find ways to improve the (COSTS OF CAPTIONING ITSELF) cost of captioning. And one way, in the paper that is attached to my presentation, talks about voice recognition. This is an infant technology at the moment but the time is now to start exploring that issue--exploring the ways to harness that type of technology to the benefits of captioning and to make sure that the largest--large number of caption programs are accessible to deaf people.

When the cost comes down for a captioning at that time, it (CAPTIONING, AT THAT TIME) will be much easier for deaf organizations to pinpoint the needs of corporate responsibilities (FOR CORPORATE RESPONSIBILITY) for all the networks. The networks have a corporate responsibility--that's very clear. But exactly what is the line of responsibility--that issue is not--it's not clear. It's not an issue that I want to get involved in. I think it's better to discuss--have it discussed by organizations of deaf people that have

representatives, for example, the NAD, National Association of the Deaf.

Okay, now if we find the means to reduce the cost to the consumers, then we can reduce the costs to produce the captions also. Then the number of programs available, which I am saying is more television accessibility, will be more accessible. And what I mean by that, I mean that deaf people will be able to see the captions. Deaf people that don't have decoders can't see the captions; and when you see the captions it increases the understandability By 50 percent. YOU CAN INCREASE THE NUMBER OF CAPTIONED PROGRAMS BY 50% And when they don't have one, it doesn't make TV more BUT IF DEAF PERSONS DON'T HAVE A DECODER, accessible.

I would like to stress another point, and that is I think it is the responsibility of Congress--and should be the responsibility of the organizations of deaf people--to make sure that TV accessibility is accessible to all people, not just a few of the wealthy deaf people.

I believe that the systems can co-exist. And I don't want to get into an argument or in depth about the transcoding because the problems of doing that, or any of that, but it OR can be done. Now, how it can be done is another matter--but that it does co-exist. The dual mode captioning makes that THEY CAN CO-EXIST. possible. And that's what we have here now today.

Congress may want to consider the possibility of requiring dual mode captioning such as the NAD will suggest in their

presentation.

Now I want to go beyond that just a little bit and mention that I mention in my paper that both England and France have enacted regulations to have the decoder system include TELETEXT DECODER SYSTEMS INCLUDED IN ALL teletext for a future date--probably in 1985; the same way TELEVISION SETS AT that Congress acted on regulations to have all--in the same way that all television systems are not required to have UHF TELEVISION RECEIVERS WITH UHF TUNERS AS WELL AS VHF AT A SPECIFIC DATE. or VHF.

Now we are coming to the point of really talking about mass production and mass distribution. And when you talk about millions, then you start talking about LSI chips that were mentioned this morning.

Now, the LSI chips--I mean, you are not talking about 100,000 sales within the--100,000 sales isn't enough to WITHIN THE DEAF COMMUNITY-- support that type of development. Where are we going to get 1 million, 5 million, or 10 million consumers for the LSI chips? Not from deaf people. And certainly at the beginning THE BEGINNING prices now and not by the prices that are going to be in a PRICES FOR DECODERS NOW ARE NOT THE PRICES few years before the cost goes down, as it did before. WHEN THE COST GOES DOWN AS IT HAS BEFORE.

Now, that's not stopping us from the present to worry about the future. Let's work towards the future now. And that's the point of my presentation to you, gentlemen, to make sure that the future is accessible to deaf people at the present and not wait for the future to come by itself.

But CBS did not experiment with teletext and they didn't CBS HAS EXPERIMENTED WITH TELETEXT AND THEY HAVE

make sure that teletext was included in captioning as part
MADE SURE THAT TELETEXT INCLUDED CAPTIONING

of the basic design of the keypads--the system itself. And

even when teletext comes out, it will still--it still won't
WOULD HAVE STILL NOT

be accessible to deaf people. But CBS's efforts in that
BEEN ACCESSIBLE TO DEAF PEOPLE IF IT WERE NOT FOR CBS'S

effort--then they are making sure that it will be accessible.
EFFORTS--

So I can't criticize them for that.

I will continue to criticize them for their insensitivity.

I don't think they have any more understanding of how deaf
UNDERSTAND HOW TO RESPOND TO DEAF

people in their requests, or how to deal with deaf people.
PERSON'S INQUIRIES

And I think their public relation efforts aren't that good.

And I will emphasize that again. But that on the line
BUT I WILL EMPHAIZE AGAIN THAT ON THE BOTTOM LINE

something has to be done to ensure that technical

development is done and that CBS is doing that.

The Congress also should consider other ways to make sure

that the technology process occurs and that it really
DEVELOPMENTS

becomes accessible to the general deaf population, not to
BECOME AVAILABLE

just a limited number of people who can afford television.
THE PRESENT TV DECODERS.

Thank you.

[The statement of Mr. Wick follows:]